JULY 2024

Richmond Green-Blue New Deal

OPPORTUNITIES REPORT

Prepared by: **Apparaccel**
as part of the Richmond Green-Blue New Deal

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Glossary

Term	Definition
BIPOC	Black Indigenous People of Color
Beneficial electrification	electrification strategies or approaches that benefit both the environment (through reducing greenhouse gas emissions) and the end-users of energy (by saving money and improving health in a way that is equitable)
Building envelope	the physical separation between the conditioned and unconditioned space in a building
Decarbonize	to stop or reduce carbon gases, especially carbon dioxide, being released into the atmosphere
Direct jobs	jobs directly supported by an industry (e.g., electricians installing electric water heaters)
Disadvantaged community (DAC)	the areas throughout California which suffer most from a combination of economic, health, and environmental burdens (California Public Utility Commission)
Electrification	a switch to technologies powered by electricity in place of natural gas or other fossil fuels
Environmental justice	the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (State of California)
Equity	fair outcomes, treatment, and opportunities for all
Greenhouse gases	gases that trap heat in the atmosphere
High-road jobs	jobs offering family-sustaining wages, benefits, and opportunities for career advancement
Indirect jobs	includes materials and capital services supplier jobs (e.g., jobs manufacturing electric water heaters)
Induced jobs	includes jobs supported by re-spending of income from direct jobs and supplier jobs, as well as public-sector jobs supported by tax revenue (e.g., jobs at restaurant where electrician dines)
Job-year	one job for one year

Just Transition	a period of transition toward a clean-energy economy with high-road jobs offering family-sustaining wages, benefits, and opportunities for career advancement
Justice-involved	people who are now, or have spent time in jails, youth correctional facilities, or prisons
Mercantile building	any building or part of a building used as shops, stores, market, malls, for display and sale of merchandise either wholesale or retail
Recidivism	the act of committing another crime or coming into conflict with the criminal justice system
Remakery	a co-working maker space that is supported by memberships, grants, and fee-for-service classes
Shared micro-manufacturing	shared space with manufacturing of products in small quantities using small manufacturing facilities
Shared micro-retail	a retail model including things like small-scale pop-up shops and boutique storefronts
Solar photovoltaics	convert sunlight directly into electricity
Upskill	to learn new skills or teach workers new skills

Executive Summary

In 2021, the City Council in Richmond, California, passed Resolution 88-21, launching the development of a Richmond Green-Blue New Deal. Their bold vision describes a "five zero" future: 1) a zero-carbon grid 2) zero-carbon transportation 3) zero-carbon buildings 4) zero waste and 5) zero wasted water.

The subsequent Richmond Green-Blue New Deal (RGBND) Opportunities Report provides a blueprint for the creation of 1,000 new green-blue jobs to help the City Council realize this future it envisions. The intent of the report is to speed up the transition to a clean-energy and zero-waste economy, with restored environmental and human health and without leaving fossil fuel industry workers and its community behind. Such a period of equitable change is called a Just Transition.

The RGBND project team spent nine months in dialogue with the Richmond community through surveys, interviews, stakeholder meetings, and workshops to understand the challenges community members face, as well as their preferences and aspirations. The Richmond community has a profound understanding of existing problems but also a deep commitment to building a just, equitable, resilient, and sustainable future by utilizing the city's assets and activating its talents.

Union labor and others advocate strongly for high-road jobs that pay enough to support a family and offer benefits and career advancement opportunities. Many community members are eager to speed up the Just Transition process and wonder what kinds of green and blue jobs are the best fit for Richmond. Once the community decides which projects to pursue, workforce development will provide training for workers to upskill for their next careers.

People who face barriers to employment, including members of the justice-involved community, are eager for training opportunities and green jobs. Community members advocating for the next generation urged the project team to also include green career awareness and training for elementary, middle school, and high school students. It's vital that interest in green careers is sparked among youth now to fill the meaningful green-blue careers of tomorrow.

The 24 project recommendations for green-blue jobs are based partly on economic forecasts about the jobs of the future and partly on governmental environmental policy goals. For example, the primary driver of growth in local renewable energy jobs is California's goal with Senate Bill 100 to achieve 100% renewable energy by 2045.

The RGBND Opportunities Report methodology comprises six elements that determine when a project can proceed to the starting line and start hiring workers. They are: 1) What is the scope of the project? 2) Where will funding come from? 3) Who is the champion? 4) Does demand for the green good or service exist? 5) Who are the workers? and 6) What training do they need to upskill?

Deciding which projects to pursue will allow RichmondWORKS to develop training to help workers upskill, depending on their entry point into the job market.

The eight project sectors include:

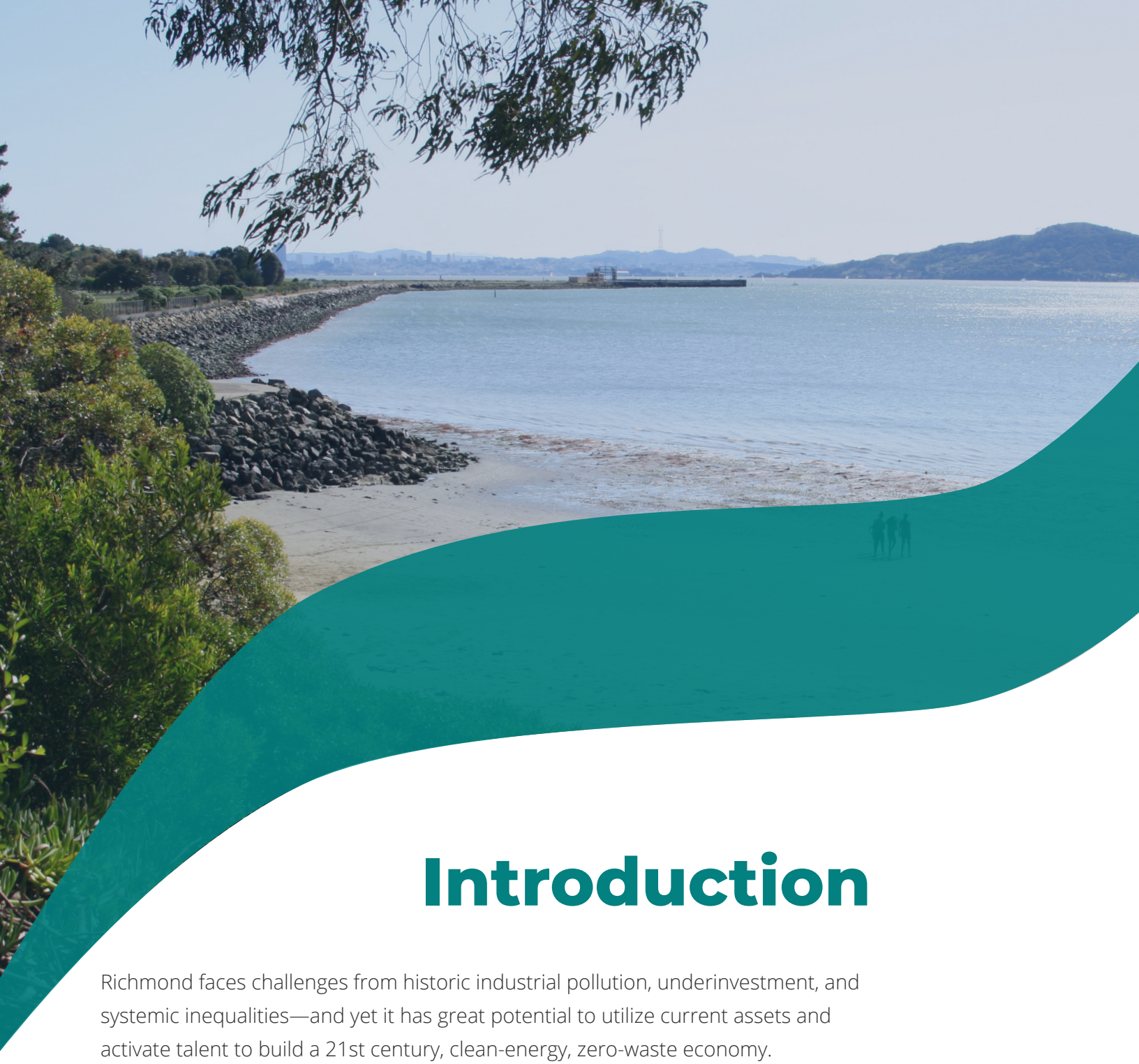
- Renewable energy
- Building electrification and energy efficiency
- Sustainable transportation
- Zero waste
- Green infrastructure and urban forestry
- Land use
- Water
- Other

Within these eight sectors are organized 24 recommended projects for green-blue job creation in Richmond:

1. Solar emergency microgrids at critical community facilities (police, fire, wastewater treatment plants, K-12 schools, healthcare facilities)
2. Battery manufacturing
3. Offshore wind manufacturing and assembly hub
4. Building electrification retrofits
5. Green accessory dwelling units and tiny homes
6. Community land trust
7. Destination downtown
8. Transportation management association
9. Transition to zero-emission vehicles
10. Building deconstruction firms
11. Building salvage warehouse
12. Richmond remakery and fixery
13. Re-entry entrepreneurs
14. Surplus food rescue
15. Expanding the tree canopy
16. Living levee
17. Brownfields research & innovation hub
18. Blue tech incubator and accelerator
19. Port upgrades, including electrification
20. Berthing vessels at the port
21. Boat building
22. Training center for boat maintenance and repair
23. Shoreline ecotourism
24. Green hydrogen

A separate RGBND Implementation Plan provides case studies about other cities where these types of projects have already been successfully implemented. Depending on whether a project needs to be fully subsidized or offers a return on investment, a variety of potential funding sources are available, including: grants, rebates, bonds, tax credits, loans, loan guarantees, and private financing.

Once grants or financing is lined up, local champions who have expressed interest in specific projects will either be selected or will step up to lead.



Introduction

Richmond faces challenges from historic industrial pollution, underinvestment, and systemic inequalities—and yet it has great potential to utilize current assets and activate talent to build a 21st century, clean-energy, zero-waste economy.

What makes Richmond prime for major public and private investment is that it is a disadvantaged community located at the intersection of important social, environmental, and economic issues; while at the same time striving to become a role model for economic growth while addressing climate change and environmental justice issues.[1]

The main goal of the Richmond Green-Blue New Deal (RGBND) project is to catalyze at least 1,000 new green-blue jobs for Richmond residents. This goal is informed

by the project's vision to employ the Just Transition model while planning for a just, equitable, resilient, and sustainable future. The project's mission involves identifying opportunities for high-road jobs that unlock local assets and talents while incorporating community preferences.

For the purpose of this report, the definitions of these key terms are:

- **Just Transition –** Building a bridge to a clean-energy economy without leaving fossil fuel workers and the community behind
- **High-road jobs –** Offer family-sustaining wages, benefits, and opportunities for career advancement
- **Just –** Racial, economic, environmental, and intergenerational justice
- **Equitable –** Everyone should have the right to a healthy environment, regardless of race, class, or other status; equitable also describes a level playing field on which all have equal opportunity for economic mobility
- **Resilient –** The ability of natural systems and human infrastructure to recover quickly from a shock or challenge
- **Sustainable –** Meeting the needs of the present population without compromising the ability of future generations to meet their needs

Many disadvantaged communities are trying to figure out how to craft a Just Transition so that workers in historically polluting industries are not left behind as society builds a clean-energy economy. This bridge to a green future involves training and opportunities for workers that build on existing skillsets and allow them to upskill for new projects. Richmond's work in this area will inspire other communities struggling with similar social, environmental, and economic challenges to develop a similar plan.

Richmond is a community of 114,106 residents on 33.7 square miles of land, with 32 miles of shoreline located along the San Francisco Bay.[2] The city contains valuable physical assets, including a deep-water port, two highways, freight train lines, and industrially-zoned land. These, along with various valuable skillsets among Richmond residents, could be put to use to build a just, equitable, resilient, and sustainable future. The path to such a future is through green-blue jobs.

This project's working definition of green jobs is "work that protects and enhances the environment for current and future generations." In order to tee up not only green jobs but also 1,000 new green-blue careers lasting three or four decades, the RGBND builds builds on the community's strengths while unlocking opportunities for residents.

Investments in green-blue jobs multiply throughout the economy. Thus, this report lays out conditions that will enable the creation of direct green-blue jobs, which in turn will multiply to catalyze indirect jobs along the supply chain, as well as induced jobs that result when workers spend money in their local economy.

Government policies support green economic growth in key ways. The City of Richmond has a framework of policies and plans designed to improve environmental health and public health outcomes. State policies, programs, and grant-funding opportunities complement the City's policies and plans. For example, the California Workforce Development Board has 70 High Road Training Partnership (HRTP) industry workgroups that have developed policies and principles for high-road jobs in various industries. The initiative was designed as a campaign to "support businesses that compete on the basis of the quality of their products and services by investing in their workforces; these businesses pay the wages and benefits necessary to attract and retain skilled workers, who in turn perform high-quality work."[3]

When planning for high-road jobs for the 21st century economy, it is important to consider the infrastructure built during Richmond's industrial past and the resultant pollution that remains.

Richmond's Manufacturing History

Richmond has a long industrial history of hosting large companies that manufacture explosives, chemicals, petroleum products, railcars, automobiles, and ships. In 1895, Giant Powder Company established an explosives manufacturing facility at Point Pinole in Richmond. In 1897, the Stauffer Chemical Company bought land and made a business trucking pyrite (fool's gold) from its Sierra mine to Richmond to roast it down into sulfuric acid. In the 1950s, the company started making chemical fertilizers and pesticides.

In 1902, the Chevron Richmond Refinery opened and over the next century grew its petroleum refining business to the point that it now occupies 2,900 acres and employs thousands of workers. In 1910, the Pullman Company established a facility to manufacture and repair Pullman railroad sleeping cars. The Ford Motor Company erected an automobile assembly plant in 1930, which converted to wartime production during World War II and then moved to Milpitas in 1956.

Also during World War II, four Richmond shipyards were built along the waterfront, employing thousands of workers. With this effort, Richmond's population increased

dramatically, rising from 23,000 in 1940 to 114,899 in 1942 and peaking at around 120,000 by 1945. Kaiser's Richmond shipyards built 747 Victory and Liberty ships for the war effort, with a record of one ship being built in just five days.

This industrial legacy brought jobs and infrastructure to the city but also left enduring pollution. Volatile organic compounds, polychlorinated biphenyls, arsenic, lead, cadmium, mercury, petroleum substances, and other hazardous chemicals contaminate soil at 442 brownfields and Superfund sites. The burden of soil pollution is compounded by air pollution from stationary and mobile sources that contribute to higher levels of asthma than surrounding communities, another compelling reason to speed the Just Transition to a clean-energy, zero-waste future.

Vulnerabilities to Climate Change

Part of the urgency around a Just Transition involves Richmond's 32 miles of shoreline. The city's proximity to the Bay leaves the community vulnerable to storm surges and sea level rise brought on by climate change. Local assets that could be affected by climate change include community services and public facilities, public health, housing and schools, water supply, wastewater management, stormwater management, transportation infrastructure, flood management, energy infrastructure, solid waste and hazardous waste management, parks, natural areas and ecosystems, and commercial and industrial assets. Specific examples of community vulnerabilities to climate change include the fact that wildfire could affect communication towers in the East Bay Hills and flooding could compromise emergency response personnel's ability to respond to community needs. The forthcoming Richmond Sea Level Adaptation and Resilience Plan seeks to address some of these concerns.

Just Transition: A Path Forward

While Richmond has a history of industrial development and pollution, the Just Transition will incorporate valuable assets built in the past century and activate them to create a clean-energy and zero-waste future: a deep water port, freight lines, highways, industrially-zoned land, and a skilled union workforce that could put their talents to use in high-road jobs. Capital investments and operational expenditures in high-road green-blue jobs in Richmond will not only allow workers to support themselves and build wealth but will also increase tax revenues. Tax revenues flowing to the city and county will then be reinvested in the community in ways that benefit residents and local businesses.

SECTION 1
Study Methodology

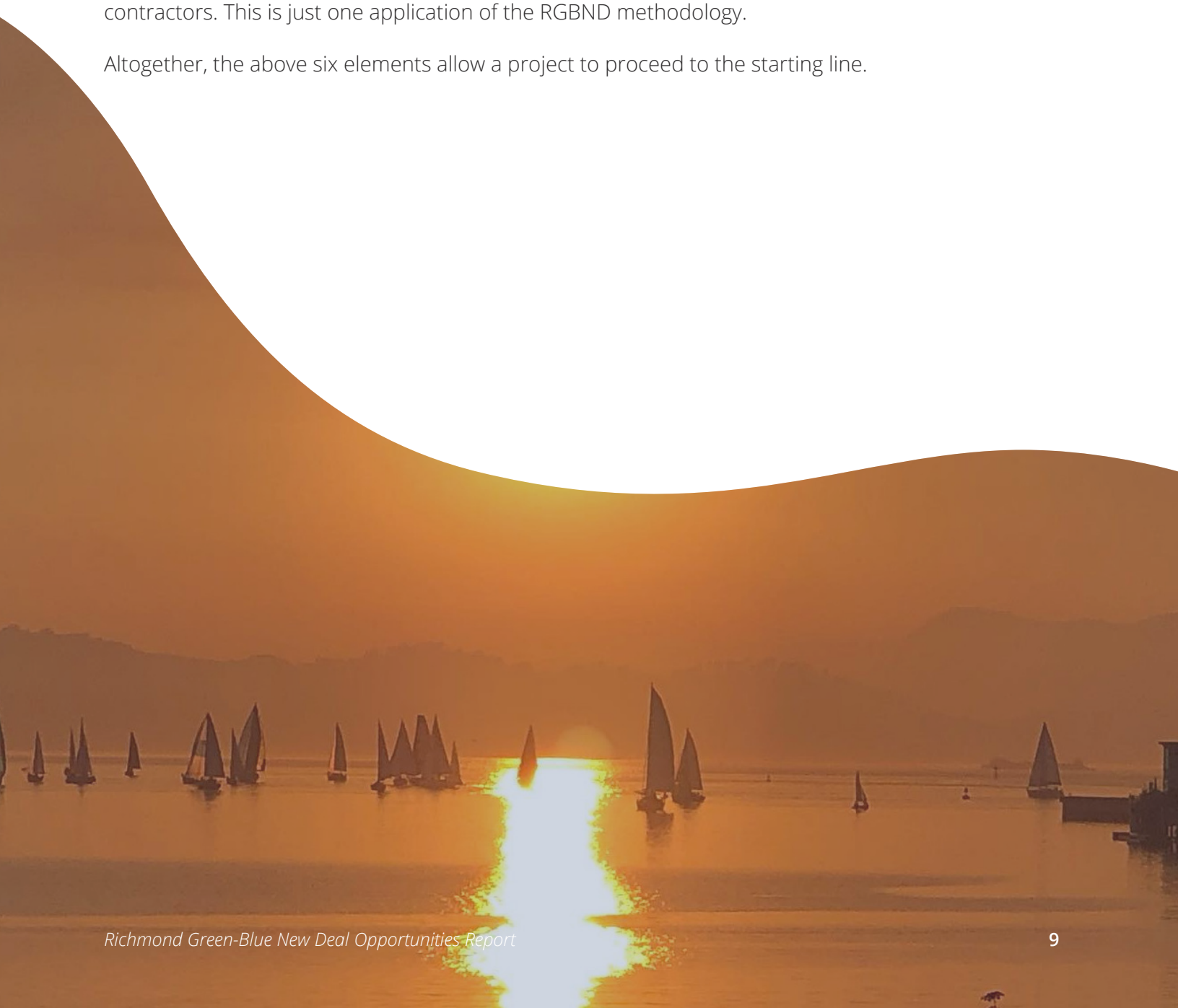
How does green-blue job creation happen? To advance projects recommended in this report to the starting line and to be able to hire people involves the following six considerations:

1. **Scope –** Does the green or blue project have a clear definition?
2. **Demand –** Is there a true demand for green goods or services?
3. **Funding –** Is there funding available from the federal or state government, the private sector, or a mix of public and private?
4. **Champion –** Who is the project's champion, the person who either helps advocate for the project and finds funding, or, if funding is already available, can serve as project manager?
5. **Workers –** What types of workers possess the skillsets needed for this work, and how can they be identified?
6. **Training –** What training is needed to upskill workers in the latest technologies?

All six elements come into play when developing a project like residential electrification retrofits, for example.

Consider a pilot project with a scope to retrofit 50 pre-1970 single-family homes with all-electric equipment in a disadvantaged area with zero upfront cost for residents. To confirm there is demand for this project, it would be helpful to partner with community-based organizations to administer a survey that gauges interest in such retrofits. Funding could come from federal and state grants for electrification retrofits in disadvantaged communities. If funding were secured, the utility or City could assign or hire a project manager (champion) to manage the project with electrical contractors. Since natural gas water heaters will be banned in the Bay Area starting January 1, 2027, electrical workers must undergo training in installation of electric heat pump water heaters before that date. The Bay Area ban on natural gas space heating will go into effect on January 1, 2029, before which training on electric heat pumps for heating and cooling should be available for contractors. This is just one application of the RGBND methodology.

Altogether, the above six elements allow a project to proceed to the starting line.



SECTION II
Community Aspirations

The Richmond Green-Blue New Deal Opportunities Report builds upon existing City plans with input from City leadership and community feedback to elevate and strengthen this report and future comprehensive economic, climate, and workforce development efforts. This section contains highlights of such input, which was gathered from City planning reports, community surveys, dozens of interviews, stakeholder workshops, and community meetings.

Foundational Vision

Inspired by the federal Green New Deal unveiled in February 2019, the Richmond City Council on July 6, 2021 passed Resolution 88-21, a local Green-Blue New Deal.[4] This resolution describes a vision of what could be accomplished with economic investments in green and blue jobs. Highlights of the equitable, economic, and environmental aspects of the resolution include the following text:

- WHEREAS, a "Green New Deal" is a program of investments in equitable clean-energy jobs and infrastructure, transforming and transitioning not just the energy sector, but the entire economy. The general goals include:
    - Energy Goals: A complete conversion to a 100% renewable energy system for both electricity and transport by 2030, partnered with the full-decarbonization of the economy by 2040.
    - Five Zeros: A zero carbon grid, zero carbon transportation, zero carbon buildings, zero waste and zero wasted water, as well as a just transition for fossil fuel workers, equitable housing and environmental justice for all.
- WHEREAS, the World Bank definition of "Blue Economy" defines it as the "sustainable use of the ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems."
- WHEREAS, the Blue Economy is not synonymous with all economic activity that occurs on coastlines and shorelines or any use of water resources, nor simply technological innovation involving water-based industries. The Blue Economy represents a narrower band of economic activity that is restorative to ocean and shoreline ecosystems and promotes broad-based economic opportunity including "blue jobs."

The RGBND builds on the Richmond City Council's foundational resolution to transform the economy and create green-blue jobs for Richmond residents.

Context

Other documents and plans the City of Richmond has developed that inspire recommendations in the RGBND Opportunities Report include:

- General Plan 2030
- Climate Action Plan
- Health in All Policies (HiAP) Strategy[5]
- Transparent Richmond
- Economic Development Action Plan Parts 1 and 2
- Grants that the City has applied for
- Workforce Development Board Workforce Plan 2021–2024
- RichmondWORKS/YouthWORKS
- RichmondBUILD/YouthBUILD
- First Mile/Last Mile – Transportation Strategic Plan
- Bicycle Master Plan

- Pedestrian Plan
- Master Greening Plan
- Shoreline Master Plan
- Community Benefits Policy
- ARPA Community Needs Assessment
- Biannual Community Survey

These documents underscore the important on-the-ground work being done by community-based organizations and City departments in Richmond.

Input from Community Engagement

During the nine-month community engagement process for the Richmond Green-Blue New Deal, the following input was gathered for the *Community Outreach and Findings Report*[6] and the *Insights About the Future Green-Blue Economy from Justice-Involved Richmond Residents*[7] report. Information was collected from Community Champion workshops, stakeholder workshops, interviews with community-based organizations, online and paper surveys, and reviews of local articles and reports. It was then incorporated into report recommendations.

Community Outreach and Findings Report

Across outreach activities, common themes and priorities emerged. Participants shared that the Green-Blue New Deal should:

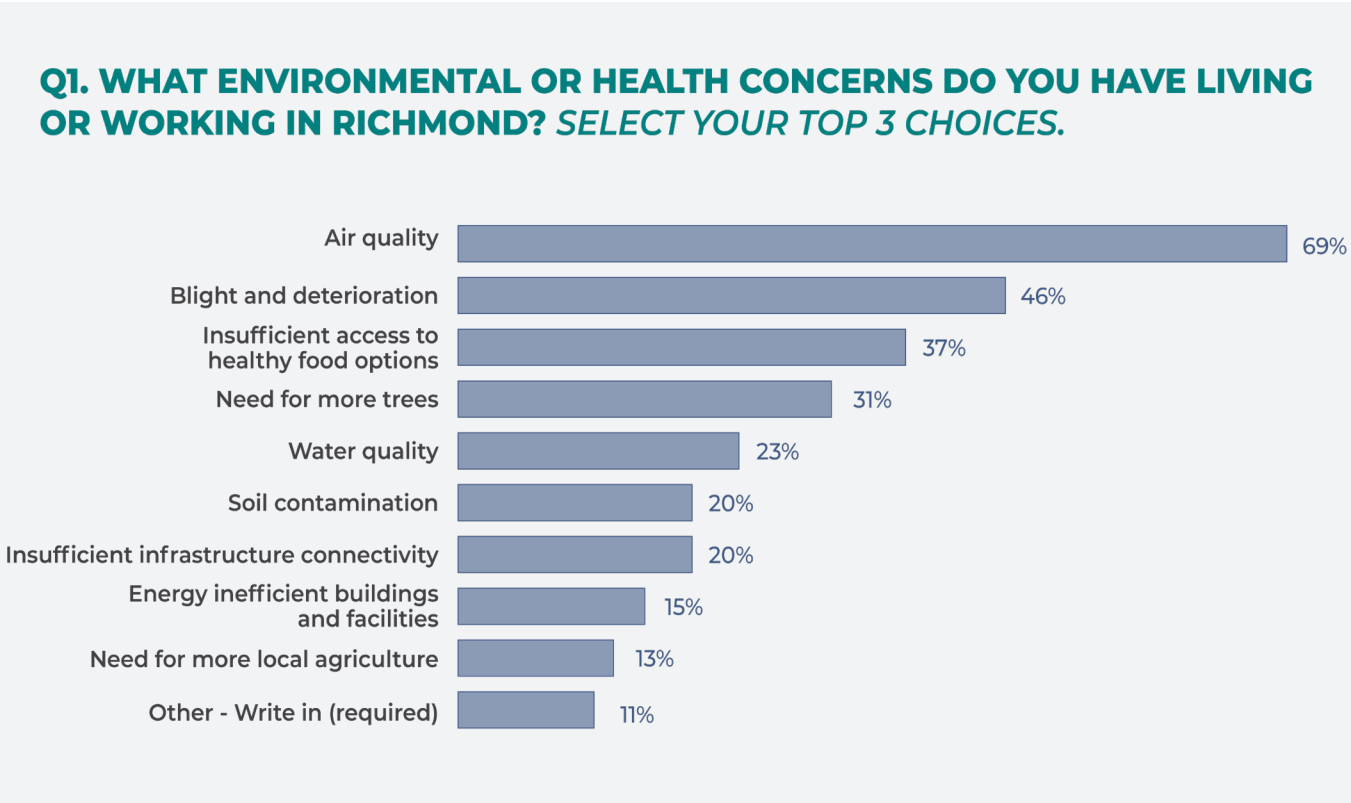
- ***Benefit Richmond residents who most need support***, including historically underserved and underinvested communities, BIPOC communities, the justice-involved community, and the unhoused.
- Ensure sustainable, long-term benefits for Richmond residents, including the ***health, employment, and housing stability benefits*** that have measurable outcomes and metrics to track progress.
- Leverage and rely on the ***local expertise of community leaders and organizations*** when moving projects forward.
- Include and clearly detail high-quality labor standards, equitable hiring policies, and ***local hiring preferences*** for Richmond residents and justice-involved candidates.
- Carefully consider and monitor how sustainable improvements can have ***unintended consequences***, such as increases to household expenses for low-income households, production of unintended waste, and gentrification.

- Clearly outline report implementation and evaluation logistics, such as: ***who will implement*** and who has decision-making power; potential sources for funding projects; how decisions will be data-driven and evidence-based; outcomes and metrics for measuring the impact on the environment, workers, and Richmond community members.

Findings of Support for Green-Blue Projects

Berkeley-based consulting firm, MIG, led a community survey that included findings from 431 people who live or work in Richmond. Figures 1 and 2 reveal the following concerns and priorities.

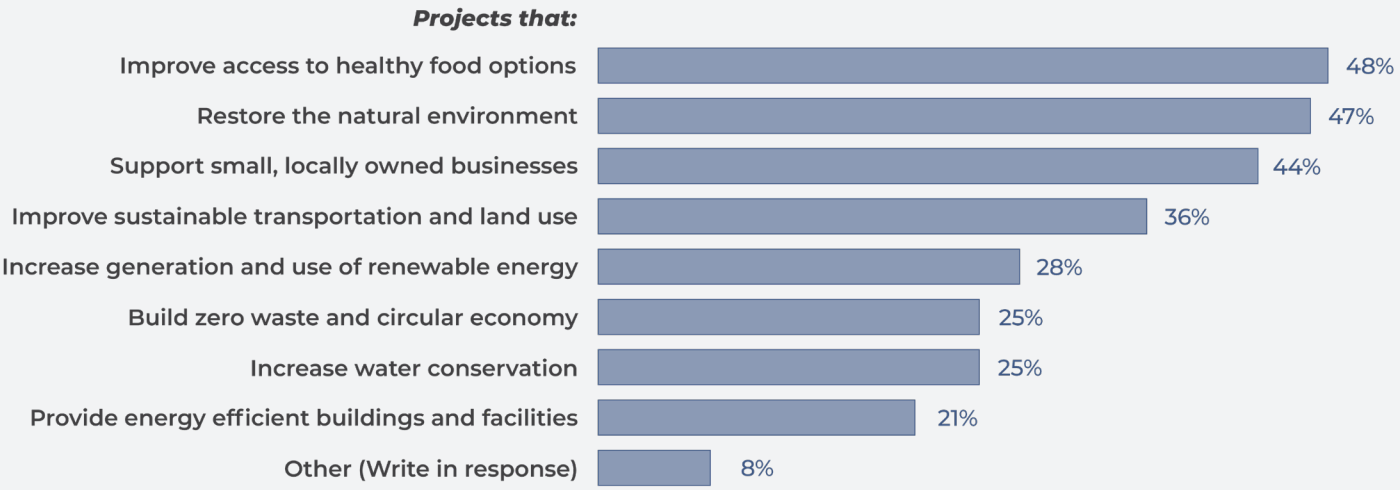
Figure 1: Community Concerns about Environmental and Health Issues



Survey responses reinforce what the team heard in community workshops that the community has concerns about visible, immediate problems, such as blight, lack of trees, food insecurity, access to healthcare and mental health services, housing affordability, air and water quality, and soil contamination.

Figure 2 shows the community's priorities for future green projects.

Figure 2: Environmental Project Priorities



See Appendix V for MIG's June 2023 *Community Outreach and Findings* report with details about community insights, concerns, and preferences.

Input from the Justice-Involved Community

In October and November 2022, three evening workshops with 30 justice-involved community members were held at the office of Richmond-based non-profit Safe Return Project. Workshop organizers sought to understand the skills the justice-involved community offers and the challenges they face, as well as to gather their insights about the future green-blue economy. Discussions yielded helpful insights about interest in and openness to new green-blue jobs in the community.

Each 2.5-hour workshop introduced the federal Green New Deal, shared several case studies, and polled the level of interest in 15 green-blue job projects. Then discussion was held about economic opportunities, upward mobility, skills, needs, and challenges.

Facilitators heard about participants' skills in management, entrepreneurship, electrical work, carpentry, painting, hospitality, research, customer service, the arts, and healing. Of the 15 green jobs projects presented for which participants were asked to vote for their top three areas of interest, the following five projects received ten or more votes:

- All-electric building retrofits (21)
- Rescuing surplus prepared food (19)
- Solar panel manufacturing (13)
- Battery manufacturing (10)
- Upcycling thrift store donations (10)

Figure 3: Safe Return Project Workshop #1

Recommendations to Support the Justice-Involved Community

As a result of information collected at the Safe Return Project workshops, organizers offer a set of recommendations for integrating justice-involved people into the green-blue economy:

- Job training – pre-release
- Paid job training – post-release
- Work readiness support
- Trauma-informed services
- Creation of job centers
- Post-incarceration job placement assistance
- Employment education fairs
- Green-blue jobs notification system
- Re-entry retention services

For aspiring entrepreneurs:

- Cohorts of entrepreneurs to support each other while developing business plans, identifying funding, and working on other aspects of launching a business

For employers:

- Training that guides recruitment and screening conversations with formerly incarcerated individuals who have hard and soft skills that match employers' hiring needs (See the Fair Chance Corporate Cohort case study in the sidebar)
- Education about Richmond's Ban the Box ordinance

For government:

- Create a Fair Chance Advisory Committee

In a tight labor market, society cannot afford to exclude people who are willing and able to work.

Fair Chance Corporate Cohort Training

Jobs for the Future hosts the Fair Chance Corporate Cohort which was designed for Human Resource and Operations professionals within companies looking to build inclusive, competitive, and thriving workplaces. The cohort model guides a small group of companies through a several week training and coaching process that prepares participants to actively embrace and adopt a Fair Chance Employment program. Participants learn how to assess their company's current state of employment practices, debunk common myths about fair chance employment and create a customized implementation plan for their companies.

The group gathers virtually to participate in lessons with experts in employment law, human resources, change management, those with lived experience and more.

Many formerly incarcerated individuals who have served their debt to society would like to work to support themselves and their families. At the same time, the work of designing and building a just, equitable, resilient, and sustainable future needs people with a variety of skills, talents, and interests.

See Appendix VI for the full report from Safe Return Project.

Community Concerns and Preferences

During dozens of one-on-one interviews and community workshops over nine months of community engagement, people who live or work in Richmond generously shared their concerns and preferences about the future of green-blue jobs. Project organizers gathered the following insights.

Human Health and Environmental Health Improvements

Residents in Richmond have a deep understanding about immediate and visible problems in the city. Community-based organizations (CBOs) with deep roots in Richmond work day-to-day to improve life in their city and have, in part, conducted listening projects, interviews, and surveys, and residents have shared their own lived experiences. These efforts have resulted in an understanding that the Richmond community is concerned about:

- Illegal dumping
- Soil contamination
- Poor air quality
- Health issues

Richmond residents may experience higher rates of certain asthma and cardiovascular-related health issues, compared to neighboring communities. Some census tracts located in Richmond are in the top 10% in the state for the highest rates of emergency room visits for asthma-related issues and in the top 20% for emergency room visits for cardiovascular issues (e.g., heart attacks). The California Office of Environmental Health Hazard Assessment (OEHHA) provides detailed CalEnviroScreen 4.0 maps of the extent to which Richmond residents and workers are relatively burdened by pollution and suffer worse health outcomes compared to other communities in California.[8]

Other issues the Richmond community expressed concern about include:

- Power blackouts
- Growing unhoused population
- Food insecurity
- Limited access to parks
- Less dense tree canopy than other nearby communities
- Difficulty accessing healthcare and mental health services

These problems were compounded when the pandemic hit communities like Richmond, which has a high number of essential workers—people who have to be physically present to do their jobs. From a longer-term environmental perspective, Richmond's 32 miles of shoreline makes it a frontline community vulnerable to the effects of climate change.

Green-blue jobs and the associated projects in renewable energy, building electrification, sustainable transportation, zero waste, green infrastructure, land use, and water will lead to improvements in many of these human and environmental health concerns.

Equity and Environmental Justice

Community members have a strong sense of the challenges facing Richmond and the specific issues that create a drag on economic development. For historically disadvantaged and marginalized communities like Richmond—which have been affected by generations of racist exclusionary policies and that shoulder a burden of excessive pollution—there are forces trying to right these wrongs. Public investment allocated by federal, state, and regional governments seeks to shape a pathway upward and in the process create green jobs so people can support themselves and their families.

In this spirit of aspiration and renewal, the RGBND offers a blueprint for a more just, equitable, resilient, and sustainable future for the residents of Richmond.

Investments Benefit a Diverse Cross-Section of the Community

During meetings with Richmond residents, the RGBND team heard concerns that an increase in the number of green-blue jobs could accelerate gentrification in Richmond. The city has a rich history dating back to World War II, when about 90,000 people worked as boatbuilders for the war effort. Fourth-generation descendants of these workers still reside in Richmond and hold deep ties to the community. As the City plans for new green-blue industries and jobs, efforts should be made to ensure that the capital investments driving such job creation will benefit a diverse cross-section of the Richmond community.

Wealth-building

Historically, forces in Richmond have constrained wealth-building. One harmful policy from the Federal Housing Administration in the 20th century restricted mortgage insurance for black families, which curtailed their ability to purchase a home, the main way Americans build wealth. The effect of this policy has been felt across generations.

The median household income in Richmond is $79,478, lower than many other communities in the Bay Area.[9] Expanding the number of available high-road jobs, facilitating housing construction, and reducing the pollution burden on the community will allow for local wealth-building.

Union Labor

In workshops with the Contra Costa Building Trades and other local unions, the leadership made a strong case for how union labor offers multiple benefits in projects: unions provide state-recognized accredited training for their members on the latest technologies, offer family-sustaining wages and benefits, and provide structured career pathways. A major element of training involves safety issues and, as such, work sites with union labor will be safer for workers.

Unions provide opportunities for communities currently underrepresented in the trades (such as women, people of color, recent high school graduates, and the formerly incarcerated) to enter and succeed in union-led industries.

Finally, unions provide apprenticeships and vocational and on-the-job training to ensure a well-trained, qualified, and safe labor pool.

Just Transition

To address climate change, a rigorous framework of federal and state environmental policies are planning a transition away from fossil fuels and toward a clean-energy economy. To ease this transition, many stakeholders are pushing for justice on multiple levels: for fossil fuel industry workers, for communities in which fossil fuel industries operate, and for environmental justice at a larger level.

In the absence of one universally agreed-upon definition of Just Transition, the following definitions explore different but complementary elements to consider:

- The California Workforce Development Board report Putting California on the High Road: A Jobs and Climate Action Plan for 2030 defines Just Transition as protection, support, and compensation for displaced workers and communities when a society makes significant policy decisions that result in job loss in affected industries.[10]
- The International Labor Organization provides guidelines highlighting the anticipated impact on employment, the importance of skills development and decent work during the transition to clean energy, and adaptation needed by companies and communities to avoid loss of assets and livelihoods or involuntary migration.
- The Organization of Economic Cooperation and Development (OECD) states that the primary goal of the Just Transition is to ensure that the transition to a low-carbon economy does not disproportionately harm workers and communities dependent on carbon-intensive industries.
- Local non-profit Climate Justice Alliance developed the Just Transition Principles asserting that a Just Transition should:
    - Move us toward *Buen Vivir* – meaning to live well without living at the expense of others
    - Create meaningful work – centers on the development of human potential, creating opportunities for people to learn, grow, and develop to their full capacities and interests
    - Uphold self determination – all people have the right to participate in decisions that impact their lives
    - Equitably redistribute resources and power – to build new systems that are good for all people and not just a few

- Require regenerative ecological economics – advance ecological resilience, reduce resource consumption, restore biodiversity and traditional ways of life, and undermine extractive economies that erode the ecological basis of our collective well-being
- Retain culture and tradition – create inclusionary spaces for all cultures and traditions, recognizing them as integral to a healthy and vibrant economy
- Embody local, regional, national, and international solidarity – to be liberatory and transformative, we recognize the interconnectedness of our communities and our issues
- Build what we need now – beginning at a small scale, we must build and flex our muscles to meet our communities' needs

As society builds a clean-energy future and moves away from fossil fuels, we want to provide a bridge to the high-road jobs of the future. Union labor in the fossil fuel industry provide strong skillsets that, with additional training, can serve as a bridge to clean-energy jobs.

SECTION III
Community Profile

Workers in Richmond-based businesses and community-based organizations, as well as labor union members and residents living in Richmond, have talents and skills that will be valuable in future green jobs. To grow green jobs in Richmond, the community should first look to existing businesses in Richmond that could expand their offerings to include projects outlined in this report. During the course of RGBND community engagement and developing this report, a number of businesses expressed interest in pivoting to green offerings in the future.

For the RGBND, economic development consulting firm HR&A researched and authored a report titled *Richmond Green-Blue New Deal Workforce Development Plan: Community Profile and Economic Development Insights*.[11] It identifies five key industries in the local economy with specific skills that will be useful in the future green economy, as highlighted in Figure 4.

Figure 4: Richmond's Key Industries Critical to the Green Economy

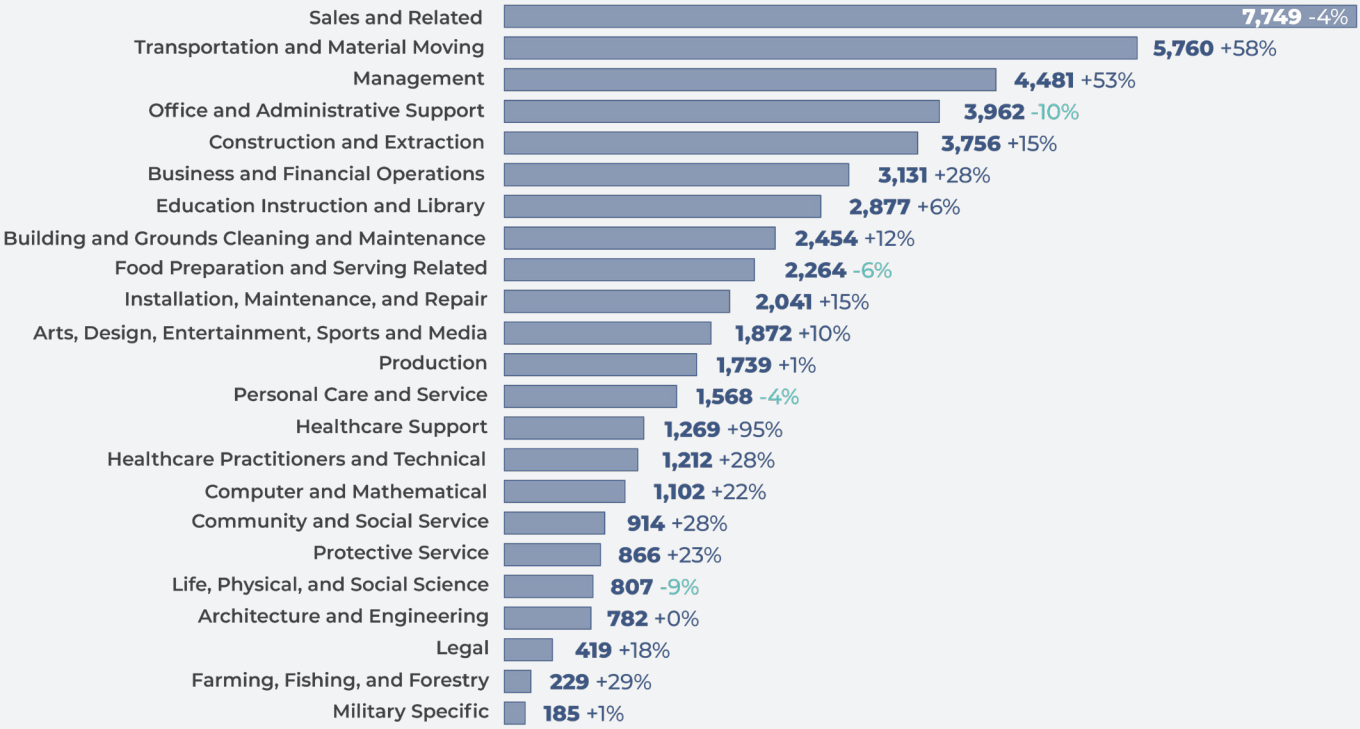
Industry	Key Stats (2010-2021)	Implications for Green Jobs
Utilities (2-digit NAICS)	2021 Jobs: 1,178 Growth: 117% LQ: 8.72 Comp: 100%	Richmond's current strength in the oil and natural gas industries will become a liability as fossil fuels are phased out. Richmond workers' skills can be redirected and supplemented to support clean energy development and operation.
Water Transportation (3-digit NAICS)	2021 Jobs: 374 Growth: 45% LO: 24.39 Comp: 112%	Water transportation tends to have a relatively low carbon footprint, so climate action may entail growth in this sector. The electrification of freight and passenger vessels and drayage trucks, and the development of infrastructure to support electric vessels, are still emerging fields.
Commercial/Industrial Machinery Manufacturing & Repair (4-digit NACIS)	2021 Jobs: 674 Growth: 27% LQ: 6.90 Comp: 73%	Extending the life of existing equipment through maintenance, repair, and refurbishment is critical for minimizing waste. Decarbonization will also entail the creation of new commercial and industrial machinery.
Building Construction & Services (3-digit NAICS)	2021 Jobs: 1,843 Growth: 45% LQ: 3.34 Comp: 37%	Electrification and energy efficiency retrofits are labor-intensive investments that will require skilled workers throughout the region to construct and service. This is a major employment industry in Richmond that can be leveraged.
Research & Development (4-digit NACIS)	2021 Jobs: 1, 155 Growth: -24% LO: 5.58 Comp: -231%	Greening the economy requires innovation; although Richmond currently has a relatively high concentration of R&D jobs, its growth in this area has lagged behind the national average.

Source: *HR&A's analysis of Lightcast data*

Given that some of the main skills needed in the 24 green-blue projects involve electrical work, construction, manufacturing, research, and water transportation, these key industries are poised to provide talent for the future green economy.

HR&A analyzed the types of industries and jobs currently in Richmond. As of 2021, Richmond had 51,400 jobs, with one-half of these in professional services, industrial trades, and retail. Figure 5 lists the number of jobs by occupation and their growth between 2010 and 2021.

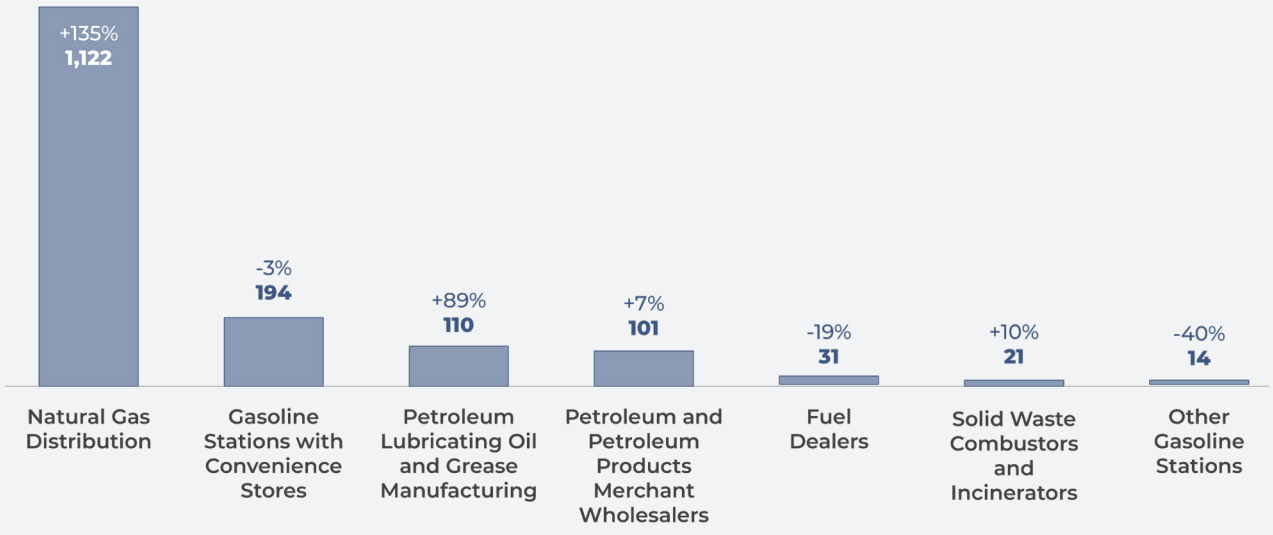
Figure 5: Jobs in Occupation in Richmond (2021) and Jobs Growth (2010-2021)



Many of the skills in these jobs could be applied to green and blue jobs.

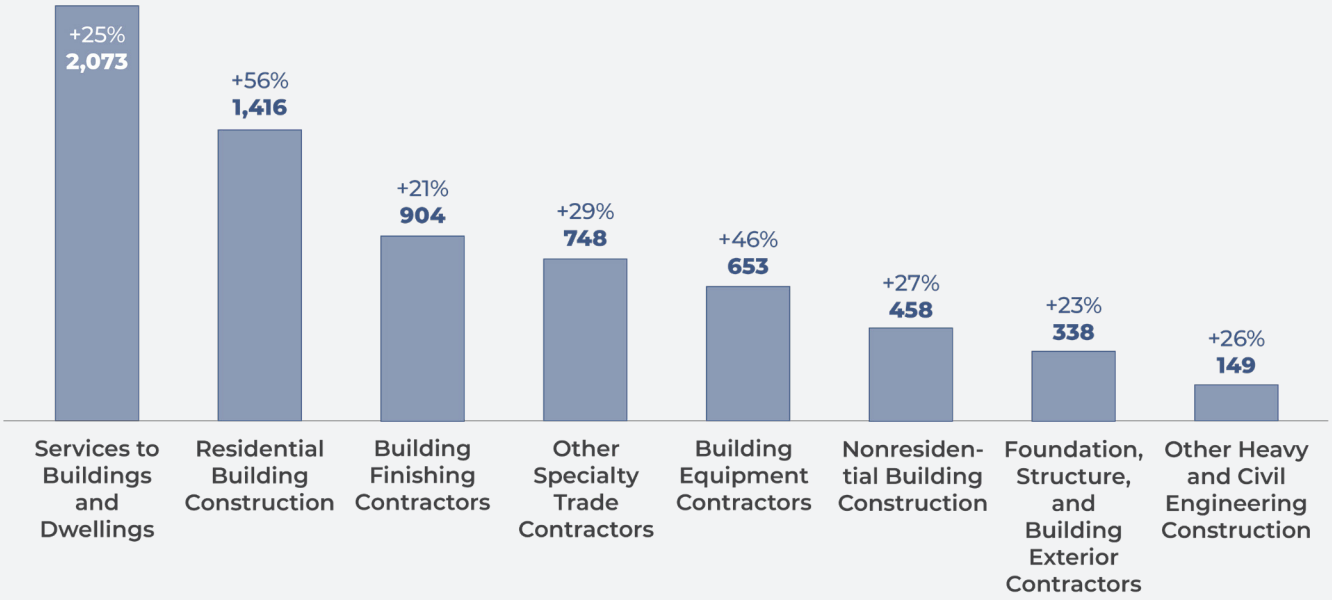
As the City plans for a Just Transition to a clean-energy future, it's helpful to look at the number and type of fossil fuel jobs based in Richmond. Figure 6 shows the growth or contraction of each type over the past decade.

Figure 6: Extractive Industry Jobs in Richmond (2021) and Change in Jobs (2010-2021)



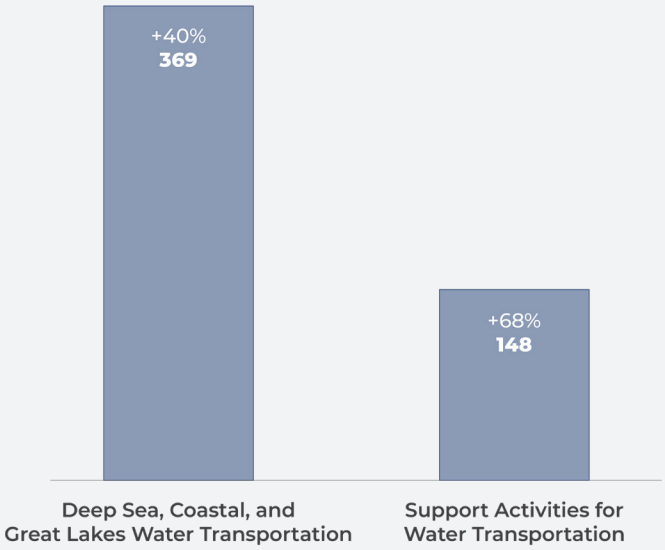
Another industry that employs many workers in Richmond is building and construction. Workers with these skills are in high demand. Figure 7 shows changes in the number of building, construction, and service jobs in Richmond over the past decade.

Figure 7: Building, Construction, and Service Jobs in Richmond (2021) with Change in Jobs (2010-2021)



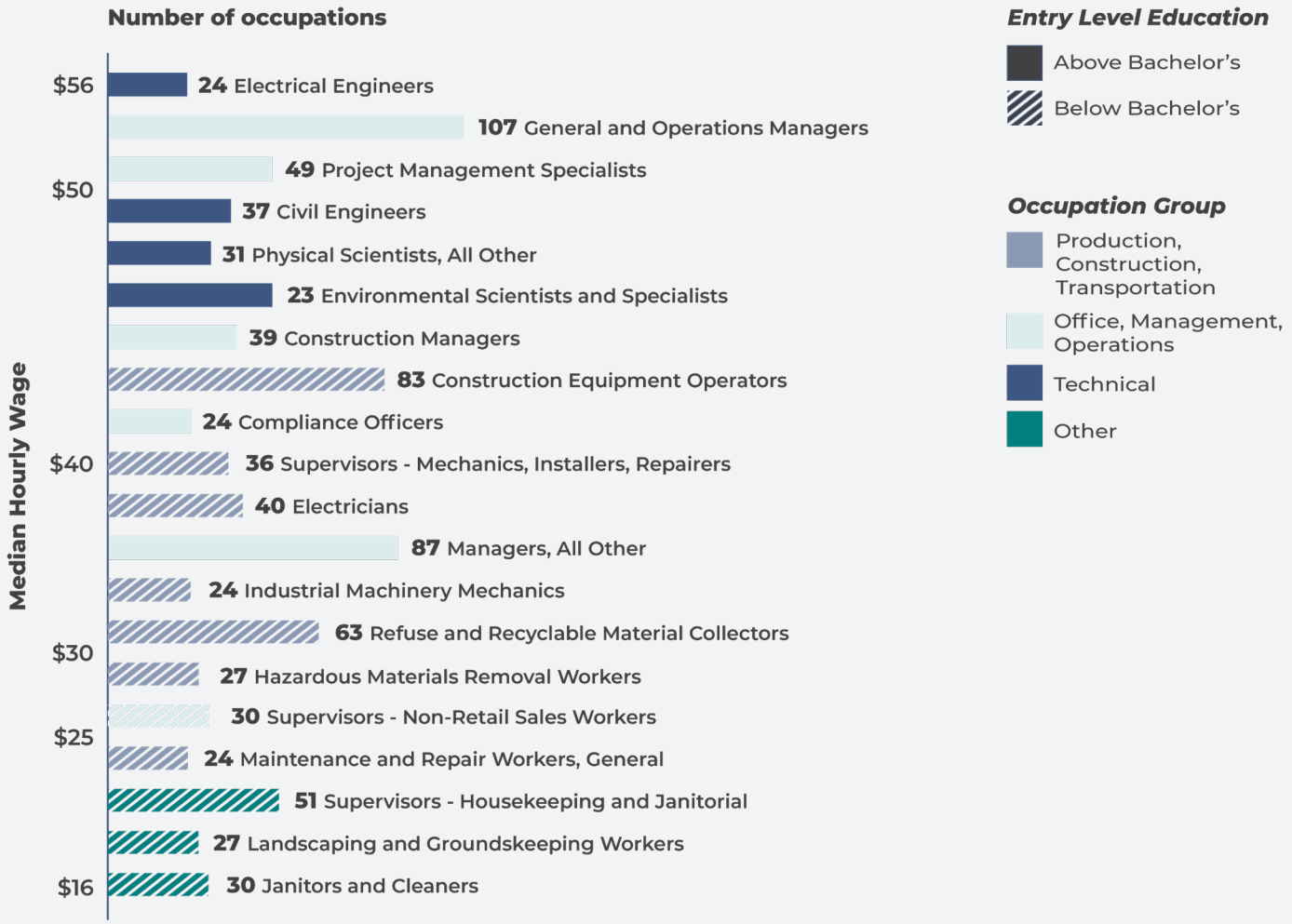
A sector that has been growing and also has high demand for workers is water transportation. Figure 8 shows the level of growth over the past decade.

Figure 8: Water Transportation Jobs in Richmond (2021) with Change in Jobs (2010-2021)



Finally, as we seek to catalyze growth of high-road jobs with family-sustaining wages, it's helpful to look at the spectrum of hourly rates for existing green jobs. Figure 9 shows the median hourly wage for green jobs in the top 20 occupations for green skill jobs on a spectrum from $16/hour janitorial and cleaning jobs to $56/hour electrical engineering jobs.

Figure 9: Green Jobs in Top 20 Occupations for Green Skill Jobs in Richmond (2021)



As the City leads economic development efforts to catalyze the green-blue jobs of the future, it's helpful to understand the talent pool that already exists in Richmond.

SECTION IV

Green-Blue Project Recommendations

Considering the assets and talents Richmond has to offer, the community's preferences, governmental policy goals, and investment funding available, the Richmond Green-Blue New Deal team recommends the following 24 green-blue projects for consideration. The projects to support green-blue job creation fall into one of eight categories: 1) renewable energy 2) building electrification and energy efficiency 3) sustainable transportation 4) zero waste 5) green infrastructure and urban forestry 6) land use, 7) water, and 8) other.

Figure 10: Recommended Projects for Green-Blue Job Creation in Richmond

Sector	Recommended Projects
Renewable Energy	• Solar emergency microgrids (SEMs) at critical community facilities (police, fire, wastewater treatment plants, K-12 schools, healthcare facilities) • Battery manufacturing • Offshore wind turbine manufacturing
Building Electrification and Energy Efficiency	• Building electrification retrofits • Green accessory dwelling units and tiny homes • Community land trust
Sustainable Transportation	• Destination downtown • Transportation management association • Transition to zero-emission vehicles
Zero Waste	• Building deconstruction firms • Building salvage warehouse • Richmond remakery and fixery • Re-entry entrepreneurs • Surplus food rescue
Green Infrastructure and Urban Forestry	• Expanding the tree canopy • Living levee
Land Use	• Brownfields research & innovation hub
Water	• Blue tech incubator and accelerator • Port upgrades including electrification • Berthing vessels at the port • Boat building • Training center for boat maintenance and repair • Shoreline ecotourism
Other	• Green hydrogen

The following provides details about the scope, demand, workers, training, career pathways, and local, regional, or national expertise available for each project.

Renewable Energy

Policies from the State of California such as Senate Bill 100 are driving the push toward 100% renewable energy by 2045. Three green-blue projects in renewable energy are included in this section.

1. Solar Emergency Microgrids (SEMs) at Critical Community Facilities (Police, Fire, Wastewater Treatment Plants, K-12 Schools, Healthcare Facilities)

Scope: When the electricity grid goes down, microgrids, or uninterruptible back-up power systems, enable critical facilities to continue to function during natural disasters and grid instability. Microgrids also provide the ability to generate power on a regular basis. They store electricity when the price is low and sell it to the grid during peak demand. Development work for microgrids involves project management, writing requests for proposals, designing and permitting microgrid systems, and installing systems.

Demand: for community resilience and emergency response purposes

Workers: occupations in solar power

- Solar engineer
- Solar photovoltaic installers

Training: electrical microgrid systems and installation

Career pathways: career advancement map for the solar industry[12]

Expertise:

- International Brotherhood of Electrical Workers (IBEW) #302
- Marin Clean Energy
- ZNE Alliance

2. Battery Manufacturing

Scope: Advanced manufacturing at factories that will be automated, digitally connected, intelligent, flexible, and sustainable, is a growth area forecasted for the San Francisco Bay Area. Battery manufacturing is a type of advanced manufacturing that will serve a key role building the clean-energy and clean-transportation systems of the future.

In complement to existing battery manufacturing operations in Richmond, the City can draw on local and state marketing resources to attract both startups and established battery manufacturers to set up shop in Richmond.

Demand: The need for energy storage, both large stationary batteries and smaller mobile batteries, will increase. Two factors are driving this demand in California: 1) the goal that 100% of in-state sales of new passenger cars and trucks be zero-emission by 2035 and 2) that 100% of electricity come from renewable sources by 2045.

Workers: occupations in battery manufacturing

- Engineering - hardware, software, advanced manufacturing
- Manufacturing
- Quality control
- Business operations

Career pathways: career advancement map for advanced manufacturing[13]

Expertise:

- Association of Manufacturers Bay Area
- Bay Area California Community College Consortium
- California Manufacturers & Technology Association
- East Bay Economic Development Alliance
- GO-Biz Office of Business & Economic Development
- University of California, Berkeley, Laboratory for Manufacturing and Sustainability

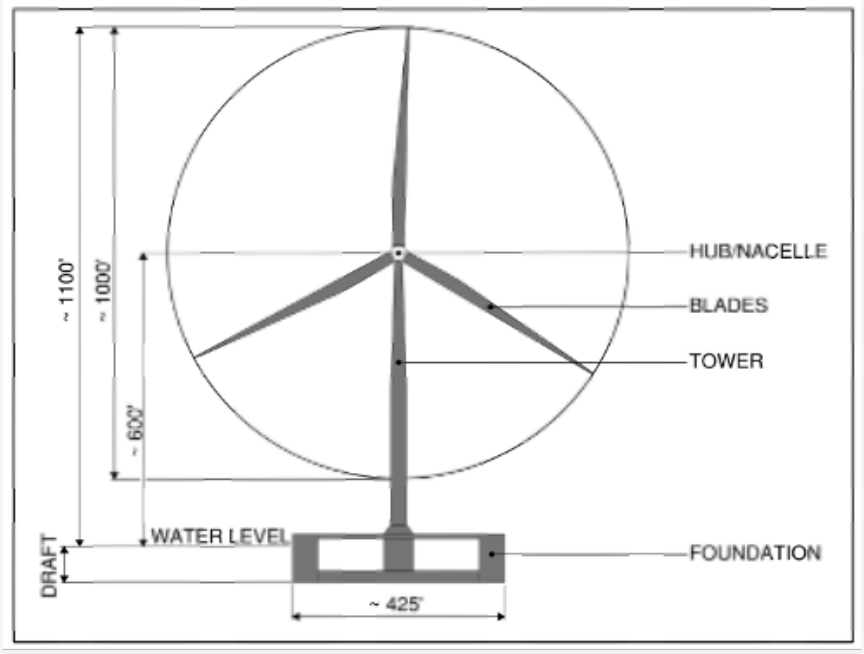
3. Offshore Wind Turbine Manufacturing

Scope: Following the December 2022 federal lease auction for the rights to develop five wind energy areas 15–20 miles off the coasts of Humboldt Bay and Morro Bay, five offshore wind developers started planning for and building capacity to manufacture and install 1,200 wind turbines by year 2030 and provide five gigawatts of clean power to California's electricity grid. Beyond that, the State is planning for 25 gigawatts of offshore wind by 2045.

Wind developers are searching for a few manufacturing/fabrication (MF) sites. These will be port sites located on a navigable waterway that receives raw materials via road, rail, or waterborne transport and creates larger components in the offshore wind supply chain. This site typically includes factory and/or warehouse buildings and space for storage of completed components.

For offshore wind turbine part or vessel manufacturing, Richmond's valuable talents and assets could be put into service: trained union labor with expertise in metal fabrication, a deep-water port, freight lines, highways, and industrially-zoned land. Several different component parts involving metal fabrication are needed for the 15-megawatt, thousand-foot-tall wind turbines, including: towers, nacelles, turbine blades, foundations, subsea cables, mooring chains, and anchors.

Figure 11: Parts of an Offshore Wind Turbine



Source: *Bureau of Ocean Energy Management*

In order to realize the State of California's 25 gigawatts of offshore wind development by 2045, the following number of manufacturing facilities will be needed on the West Coast (note the number of green-blue jobs that will be created in doing so):

Figure 12: Number of Manufacturing Jobs and Investment per Facility to Support 25 Gigawatts Offshore Wind Deployment on the West Coast

Component	# of Facilities	Total Jobs	Facility Investment ($ millions)
Blades	2	1,000	$600
Towers	2	580	$500
Nacelle Assembly	2	460	$500
Floating Platform	3	720	$300
Floating Platform Subcomponents	2	Not applicable (N/A)	N/A
Substation	2	N/A	N/A
Mooring Rope	1	110	$50
Mooring Chain	1	110	$500
Anchor	N/A	N/A	N/A
Array Cables	1	230	$350
Export Cables	1	230	$350
Total	16	3,440	$3,150

Source: *National Renewable Energy Laboratory*[14]

Demand: California aims to provide consumers with 100% renewable zero-carbon energy by 2045, and offshore wind is key to attaining this goal. The California Energy Commission, as directed by Assembly Bill 525, is leading offshore wind development analysis and economic development to help the state realize five gigawatts by 2030 and 25 gigawatts by 2045. Currently, 36 ports are in development nationwide and 64–84 more are needed for a clean-energy transition.

Workers: Port upgrades will require planning, hazardous materials remediation and construction. Occupations in offshore wind turbine parts manufacturing include:

- Engineering - hardware, software, advanced manufacturing
- Manufacturing
- Quality control
- Business operations

Training: developed by local unions[15]

Career pathways: U.S. Department of Energy's Wind Career Map[16]

Expertise:

- Association of Manufacturers Bay Area
- Bay Area Community College Consortium
- California Manufacturers & Technology Association
- East Bay Economic Development Alliance
- GO-Biz Office of Business & Economic Development
- International Brotherhood of Boilermakers (Boilermakers)
- International Brotherhood of Electrical Workers (IBEW)
- International Brotherhood of Teamsters (Teamsters)
- Laborers' International Union of North America (LIUNA)
- International Longshore and Warehouse Union (ILWU)
- Sheet Metal Workers' Local 104
- United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry (UA)
- University of California, Berkeley, Laboratory for Manufacturing and Sustainability

Building Electrification and Energy Efficiency

The next four projects involve adding value to existing buildings and building new housing units. Doing so will build wealth in the community as well as expand the supply of available housing in equitable ways.

4. Building Electrification Retrofits

Scope: Richmond has an opportunity to upgrade the existing residential and commercial building stock. The 2023 National Renewable Energy Lab's report *Equitable Electrification Analysis for Existing Buildings in Richmond, CA* analyzes data about Richmond's buildings and presents questions to the City's leadership about how they could potentially focus the project.

Determining the scope of a project for residential and commercial building electrification will depend on which of the following five variables are most important to the City of Richmond:

1. Energy consumption – of heating, ventilation, and air conditioning (HVAC) systems and certain appliances and equipment used in buildings
2. Greenhouse gas emissions – associated with energy consumption
3. Utility bill charges – and cost-effectiveness associated with energy consumption patterns
4. Employment indicators – including estimated number, type, and quality of jobs associated with building electrification and other energy improvements
5. Health and safety indicators – for Richmond residents and workers related to building electrification and other energy improvements

Ideally, building electrification and energy efficiency projects in Richmond would incorporate all five variables to help low-income households reduce energy use, reduce greenhouse gas emissions, reduce energy bills, create green jobs, and improve indoor air quality. A pilot program would provide real-world data to see where trade-offs may happen and inform the scope of future projects.

Residential buildings

Many of Richmond's homes were built during World War II, and opportunities to insulate and upgrade to energy-efficient electric abound. In fact, 11% of homes in Richmond were built in 1939 or earlier. Seventy percent of homes were built in 1979 or earlier, before California's energy efficiency standards went into effect.[17] Opportunities to electrify residences and reduce greenhouse gases center around interior heating and water heating, which are dominated by natural gas use and consume more than half of a home's energy.

The National Renewable Energy Lab's 2023 report estimates that 4,771 direct jobs (job years) would be created if Richmond upgraded residential buildings to all-electric and insulated the building envelopes. Overall, this project could support 7,500 direct and indirect full-time jobs, with two-thirds of the jobs being local.

Figure 13: Estimated Number of Jobs to Upgrade Richmond's Existing Residential Building Stock

Upgrade Scenario	Direct Jobs Only		Direct + Indirect Jobs	
	Total Jobs	Net/New Jobs	Total Jobs	Net/New Jobs
Envelope	1,358	1,358	2,148	2,148
Electrification (lower/ higher average)	3,413	853	5,396	1,349
Envelope + Electrification	4,771	2,212	7,544	3,497

Source: *National Renewable Energy Laboratory*[18]

Note that number of jobs estimates do not include any "readiness" work that may be needed prior to envelope or electrification upgrades, other than service panel upgrades. For example, in NREL's report, job estimates do not address issues such as structural weaknesses in the home, roof leaks, mold, or pest infestations. They also do not include jobs associated with the installation of solar photovoltaics.

Commercial buildings

Among commercial buildings in Richmond, food-service establishments represent 1% of commercial floor area in Richmond but have the highest energy consumption per square foot. According to NREL's 2023 report *Equitable Electrification Analysis for Existing Buildings in Richmond, CA*, food service businesses:

> "consume an estimated five times more energy per square foot than the second largest consumer, mercantile buildings, and 11 times more than the average for all other building types. Even more striking is the per-square-foot emissions, which is seven times higher than mercantile buildings, and 19 times more than the average for all other building types. The lowest-energy consumers and emitters per square foot are lodging and healthcare uses."

Equipment and refrigeration consume the most energy in Richmond's commercial buildings (44%), of which one-third (about 15% of the city-wide total) is natural gas. Space heating is most reliant on natural gas (making up 70% of energy used for indoor heating).

Demand: New policies from the Bay Area Air Quality Management District and the State of California are driving the electrical swap-outs of natural gas and other fossil fuel technology. Doing so benefits both the environment (through reducing greenhouse gas emissions) and the end-users (by saving money and improving health).

Workers: occupations in building electrification and energy efficiency include:

- heating, ventilation, and air conditioning (HVAC) technicians
- plumbers
- lighting/wiring
- envelope/insulation
- general residential construction and remodeling
- project managers
- engineers/analysts
- permit technicians

New jobs would be insulators and electricians, while current HVAC technicians and plumbers would most likely install new technologies.

Training: provided by RichmondBUILD, and local union chapters of IBEW, SMART Sheet Metal Workers, and UA Laborers

Career pathways: advancement routes for climate control technology careers[19]

Expertise:

- RichmondBUILD
- International Brotherhood of Electrical Workers (IBEW)
- Sheet Metal Workers' Local 104

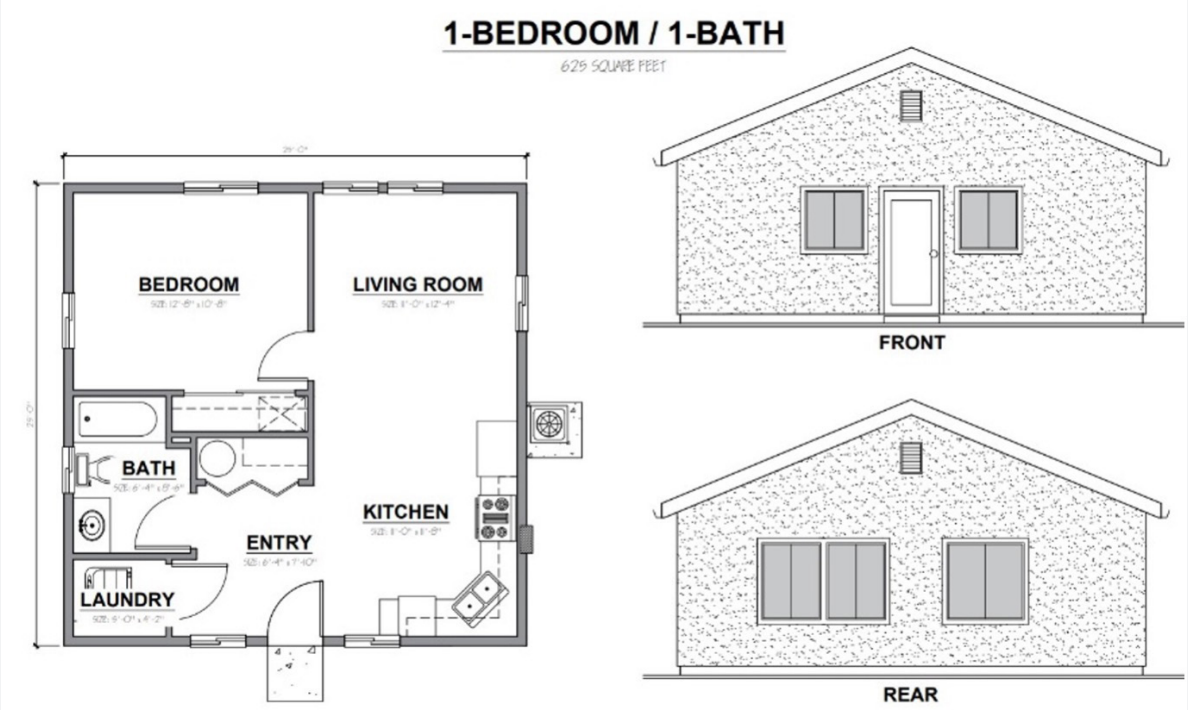
5. Construction of Green Accessory Dwelling Units and Tiny Homes

Green accessory dwelling units

Scope: An accessory dwelling unit (ADU) is a secondary house or apartment that shares the building lot of a larger primary home. The units cannot be bought or sold separately and are often used to provide additional income through rent or to house a family member. An ADU adds to the value of the property and helps the property owner build wealth.

The City of Richmond's Planning Division allows ADUs to be up to 850 square feet for a studio or one-bedroom unit and up to 1,000 square feet for a two-bedroom unit. The units can be up to 16 feet tall. Figure 14 shows one pre-approved design the City of Stockton offers to make adding an ADU easier for homeowners.

Figure 14: An ADU Design Available from the City of Stockton, CA



Source: *City of Stockton*[20]

In a state where 2.5 million additional homes are needed, the City of Richmond with support from the Association of Bay Area Governments has determined its "fair share" of new housing is 3,416 new housing units, to be built by 2031. This goal is set in the City's sixth eight-year Housing Element plan, of which 555 new units will be ADUs.

Demand: adding another dwelling to a residential parcel of land builds wealth for the homeowner

Workers: occupations in green construction

- Design – architects, engineers, planners
- Construction – managers, laborers, heavy equipment operators
- Technical specialists – electricians, HVAC installers, plumbers, installation installers, painters, glaziers, roofers

Training: construction

Career pathways: advancement routes for green building careers[21]

Expertise:

- Habitat for Humanity
- International Association of Sheet Metal, Air, Rail and Transportation Workers (SMART)
- International Brotherhood of Electrical Workers (IBEW)
- Laborers' International Union of North America (LIUNA)
- Neighborhood Housing Services Group
- North America Building Trades Union (NABTU)
- Rebuilding Together East Bay Network
- RichmondBUILD
- Rising Sun Center for Opportunity
- UA Laborers union

Tiny Homes

Scope: Tiny homes are residential structures smaller than 400 square feet of floor space. They can be built from scratch or prefabricated in a factory and delivered to the site. Sometimes they are constructed on trailers that allow them to be moved. A community of tiny homes arranged around shared kitchens and bathrooms that provides jobs can expand affordable housing options and services for people who are chronically homeless.

Demand: According to the 2022 Point-in-Time (PIT) Count, there were an estimated 632 persons experiencing homelessness in Richmond.[22] This is up from the 2020 Contra Costa County Point In Time Count of 280 individuals experiencing unsheltered homelessness on any given night in Richmond: sleeping outside, in vehicles, in tents, or in other places not meant for human habitation.

Workers: occupations in green construction

- Design – architects, engineers, planners
- Construction – managers, laborers, heavy equipment operators
- Technical specialists – electricians, HVAC installers, plumbers, insulation installers, painters, glaziers, roofers

Training:

- Rebuilding Together East Bay Network
- RichmondBUILD

Career pathways: Note that construction experience building tiny homes may serve as the first rung on a career ladder into the construction trades.

Expertise:

- Rebuilding Together East Bay Network
- RichmondBUILD
- Tiny Homes in My Backyard (THIMBY)

6. Community Land Trust

Scope: Home ownership is one means for building wealth. With sky-high housing prices in the Bay Area, many people are locked out of home ownership, especially young adults starting their careers or households with incomes below the area median income (AMI).

One way to address this issue is to purchase a house without the land, and a community land trust is one mechanism that allows this arrangement. A community land trust is a non-profit corporation that holds land on behalf of a place-based community while serving as the long-term steward for the building or community asset.

With these shared equity programs, individuals or families purchase a share of the collectively-owned property at a level that makes sense for them. Doing so helps eliminate racial wealth gaps by assisting traditionally underserved minority communities to build a degree of home equity. This legal structure can be applied to affordable housing, community gardens, civic buildings, commercial spaces, and other community assets.

For example: picture a 16-bedroom, four-bathroom home in Richmond collectively owned by 16 people in their twenties or thirties. Before moving in, the home was upgraded to energy-efficient electrical appliances and water-conserving fixtures, and insulation was installed in the walls, ceiling, floors, and air ducts. These retrofits add value to the house by lowering utility costs and increasing comfort.

Demand: Richmond has 18,606 renter occupied housing units[23]

Workers: attorneys, property managers, energy efficiency and water conservation technicians

Training: legal contracts (Sustainable Economies Law Center has a legal internship program as an alternative to law school), worker-owned cooperatives, property management, energy efficiency upgrades

Expertise:

- Cooperation Richmond
- East Bay Permanent Real Estate Cooperative
- RichmondBUILD
- RichmondLAND
- Sustainable Economies Law Center

Sustainable Transportation

Housing and transportation are the two largest expenses for households in the Bay Area. Reducing personal transportation costs while still being able to access jobs, school, healthcare, and goods and services would benefit many households.

The State has set goals to transition to zero-emission vehicles by 2035, reduce fossil fuel burning, and reduce greenhouse gas emissions. This section explores a few projects that will help the State realize these goals while improving residents' and workers' quality of life and ability to move around town seamlessly.

7. Destination Downtown

Scope: Richmond contains a vibrant community of small local businesses. Building on this success, a local champion could recruit aspiring entrepreneurs and attract regional entrepreneurs to work together to develop a cluster of businesses in one of Richmond's commercial areas.

Residents have expressed their interest to the Richmond Main Street Initiative in having more restaurants and cafes in town. Cooperation Richmond has already been working on a business plan for a worker-owned cooperative grocery store in North Richmond. Complementing these two types of businesses could be spaces with shared micro-manufacturing and shared micro-retail spaces.

Local artisans of jewelry, clothing, housewares, soaps, cosmetics, and art would find shared rent more affordable while establishing an attractive destination for residents and visitors to bike and walk to. The area would generate income and additional tax revenues as well.

Additional amenities such as restaurants, retail establishments, and cultural activities in existing commercial areas will attract even more new businesses, and the workers from those new ventures will want to eat out and attend activities in their free time, bringing new life to the economy.

Demand: residents are interested in having more restaurants and cafes in town

Workers: entrepreneurs and artisans

Training: business plans and business finance

Expertise:

- Richmond Main Street Initiative
- Cooperation Richmond
- Renaissance Entrepreneurship Center

8. Transportation Management Association

Scope: A transportation management association (TMA) is a membership organization formed to provide a forum for employers, developers, building owners, local government representatives, and others. Its constituents collectively establish policies, programs, and services to address local transportation needs and air quality issues. The funding mechanism, geographic area, membership, mission, and services are tailored to meet the specific needs of the geographic area.

Richmond is served by several different public transit agencies and electric on-demand public shuttles, has a strong bicycling community, and enjoys mild, sunny weather most of the year.

Many TMAs are non-profits that work to encourage drivers of single-occupancy vehicles to switch to trains, buses, carpooling, electric shuttles, and active mobility options (bicycling, scootering, walking). Doing so reduces traffic congestion and greenhouse gas emissions, and addresses social equity issues.

Demand: Owning a personal vehicle is expensive. The American Automobile Association announced that in 2023 the average person spent $12,128 on car payments and variable costs associated with car ownership. Having more well-connected transportation alternatives to a personal vehicle will save households money.

Workers: non-profit community outreach and education

Training: community-based social marketing, marketing, education, and outreach

Expertise:

- Commute.org in San Mateo County
- Contra Costa Centre Transit Village
- Contra Costa Transportation Authority
- Rich City Rides

9. Transition to Zero-Emission Vehicles

Scope: Planning, training workers, and installing electric vehicle charging infrastructure to support an integrated, zero-emission transportation system of the future has already begun. While continued installation of a growing network of public and private electric vehicle charging options is important, so too is a plan to ensure this infrastructure is maintained and operational.

Demand: California environmental policies lay out a pathway toward zero-emission vehicles, and by 2035, 100% of in-state sales of new passenger cars and trucks will be zero-emission vehicles (Executive Order N-79-20). The California Air Resources Board announced that by 2035, 55% of delivery vans and large pickups, 75% of commercial trucks (such as garbage trucks), and 40% of the big rigs sold in California must be emissions-free. By 2040, all public transit agencies must transition to a 100% zero-emission bus fleet.

Workers: occupations related to the transition to zero-emission vehicles:

- Urban and regional planners
- Electrical power line installers and repairers
- Electrical vehicle maintenance and repair technicians

Training:

- International Brotherhood of Electrical Workers (IBEW)
- Electric Vehicle Infrastructure Training Program (EVITP)

Expertise:

- AC Transit
- Community colleges
- Contra Costa Transportation Authority – Charge Up Contra Costa
- International Brotherhood of Electrical Workers (IBEW)

Zero Waste

Expanding the zero-waste economy, wherein fewer materials go to landfill and more materials are diverted for reuse, will create jobs and build wealth in the community. According to Tellus Institute's analysis for the U.S. Environmental Protection Agency, landfilling creates 0.1 jobs per 1,000 tons, whereas waste diversion away from landfill creates 2 jobs per 1,000 tons. Richmond currently diverts 40% of materials from landfill, while the state's recycling goal is 75%.

Increasing the number of jobs in recycling, reuse, composting, and waste prevention will boost Richmond's waste diversion and recycling rates as well as create more green jobs locally. Potential green jobs in the zero-waste sector described in this section involve building deconstruction, zero waste skill-building, entrepreneurship, and rescuing of surplus food.

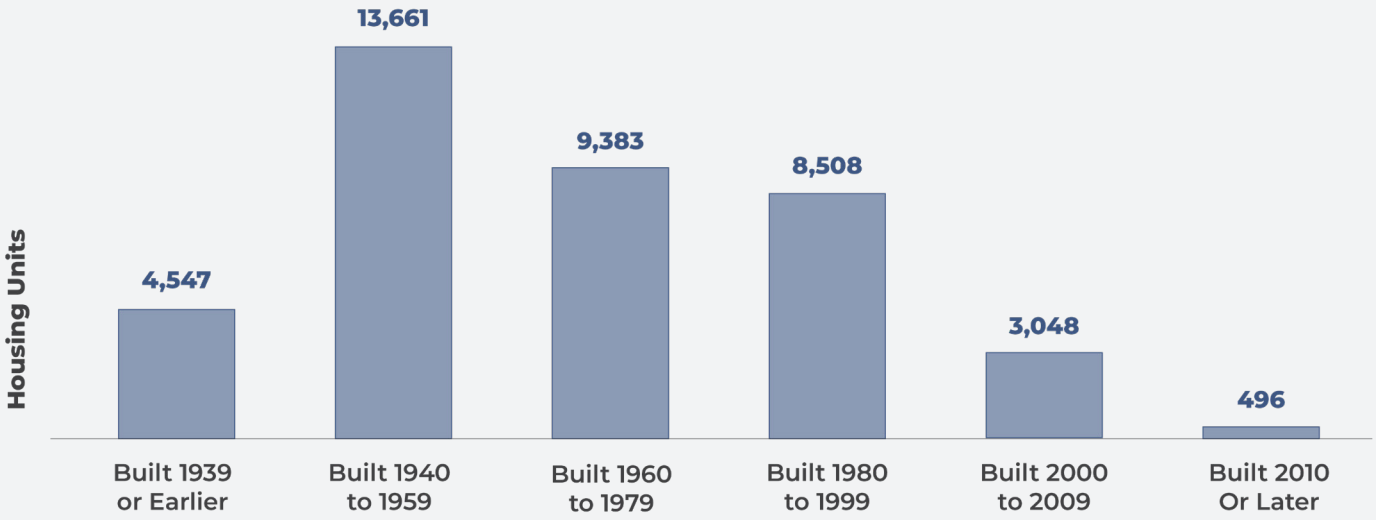
10. Building Deconstruction Firms

Scope: Deconstructing buildings instead of demolishing them, separating and organizing the materials in a sorting yard, and funneling the materials toward resale and reuse creates jobs and benefits the environment.

Older buildings often contain valuable solid-wood materials made from old-growth timber, such as wood framing, flooring, doors, and cabinets. Other items that can be salvaged include hardware, sinks, and bathtubs. Salvaging materials so they can be sold or donated to a non-profit for a tax write-off will prevent them from ending up in a landfill.

Of the 40,015 housing units in Richmond, 18,208 were built in 1959 or earlier. See Figure 15 for the age of Richmond's housing units.

Figure 15: Housing Units by Year Structure Built, City of RIchmond



Source: *City of Richmond*[24]

Renovation of older housing stock and salvaging of building materials would add value to the aging building stock and build wealth in the community while creating jobs and boosting the City's recycling rate.

Demand: The justice-involved community requested opportunities for training and green jobs during three community engagement workshops.

Workers: building deconstruction specialists and apprentices

Training: Build Reuse is the recognized curriculum, training, and certifier of building deconstruction contractors. Certification requirements include a written exam (online), skills assessment (in the field with a Build Reuse proctor), documented 2,000 hours of experience, and 3-day training. Other deconstruction training includes County of San Mateo Deconstruction Training and The Reuse People.

Career pathways: advancement routes for green building careers keeping in mind that deconstruction trainees can move up to work in the construction trades[25]

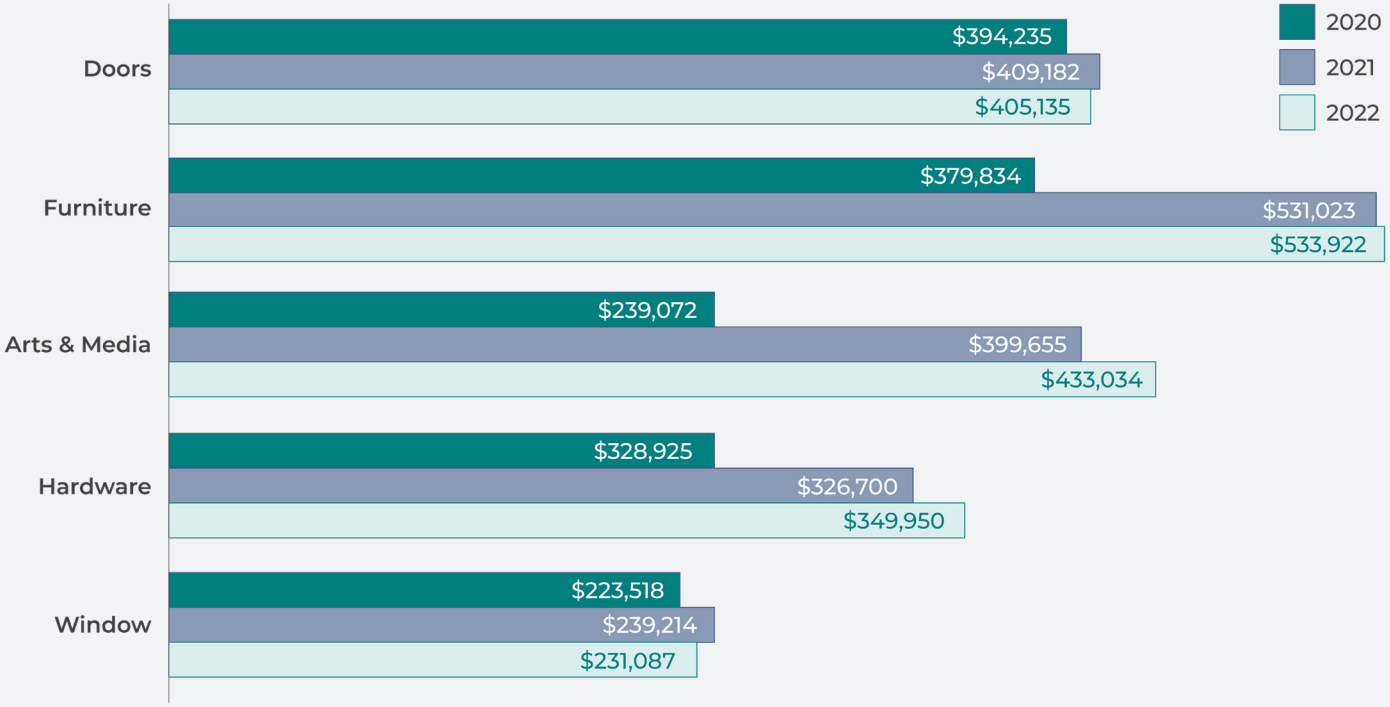
Expertise:

- Green Lynx, Santa Rosa
- Re-Use Consulting, Western Washington
- Reuse People, Oakland
- U.S. Environmental Protection Agency, Low-Carbon Building Materials Advisor, Washington, D.C.

11. Building Salvage Warehouse

Scope: Having a warehouse in Richmond that accepts salvaged building materials could help jumpstart building renovations in Richmond. Such a warehouse might find that its most valuable donated items would mirror Berkeley-based salvage warehouse Urban Ore's top revenue streams, as shown in Figure 16.

Figure 16: Urban Ore Sales by Category, 2020-2022



Source: *Urban Ore*

Given the large portion of the waste stream that is construction and demolition waste, having a warehouse to accept these types of materials would boost the city's waste diversion rate.

Demand: The age of Richmond's housing stock and the number of blighted houses points to opportunities to salvage building materials and upgrade homes.

Workers: the types of workers needed for a building salvage warehouse include:

- Laborers and freight, stock and material movers
- Shipping, receiving, and traffic clerks
- Stock clerks and order fillers
- Transportation, storage and distribution managers

Training: Build Reuse is the recognized curriculum, training, and certifier of building deconstruction contractors. Training from this organization would teach warehouse workers to identify valuable materials.

Expertise:

- This 'N That (San Pablo)
- Urban Ore (Berkeley)

12. Richmond Remakery and Fixery

Scope: A remakery is a co-working maker space that is supported by memberships, grants, and fee-for-service classes. A remakery can include any number of activities that interest the community, such as a tool-lending library, a café, repair clinics, classes, a maker space, and STEM programs for schools.

To move toward a zero-waste future, people need access to tools and to learn how to fix things. These skills, for the most part, have been lost in a society where we are frequently encouraged to discard broken things and buy new ones.

Fortunately, Richmond already has vibrant creative spaces for artists, woodworking workshops, and a tool lending library. Building on this foundation, local agency RecycleMore is interested in supporting development of a repair clinic, at which people interested in fixing household items could learn from people who have these skills.

Richmond residents have been asking the staff of the Richmond Main Street Initiative for more cafés in town, and there is an opportunity to combine efforts. By creating a new, larger space downtown with its own café, extending the hours for an expanded tool-lending library, and including a creative maker space with a woodworking workshop, as well as hosting a fixit clinic for children and adults, the Richmond remakery and fixery could become an exciting new destination for residents and people from nearby cities.

Demand: each of the pieces of a remakery are thriving separately within Richmond or nearby

Workers: people with experience as teachers, artists, in culinary arts, retail, event management, and bike, electronics, or small appliance repair

Training: Training in reuse and repair comes from learning-by-doing. Volunteer "fixers" coach others to learn skills in sewing, electronics, and small appliance repair. Maker spaces may include classes in welding, weaving, 3D printing, or other skills (depending on the projects).

Expertise:

- Berkeley Tool Lending Library
- Bridge Storage, Arts and Events
- City of Richmond Tool Lending Library, Neighborhood and Volunteer Services
- Fab Lab, Kennedy High School, Richmond
- Filma Collective Maker Space
- Fixit Clinic, Berkeley

13. Re-entry Entrepreneurs

Scope: Formerly incarcerated people need stable jobs to support themselves and their families, but many have difficulty finding work. Given structural barriers to employment, the unemployment rate for formerly incarcerated people is five times that of the general population.

A program to encourage entrepreneur-minded members of the justice-involved community to develop skills and opportunities could help some to become leaders and job creators in their community and achieve financial independence.

In combination with projects to deconstruct and salvage building materials, justice-involved entrepreneurs could develop complementary businesses. For example, older buildings contain valuable old-growth timber. Entrepreneurs could remove nails and staples from valuable salvaged lumber and sell it for new structural uses as shown in Figure 17, or use it to build furniture.

As entrepreneurs grow their businesses, they could hire other members of the community.

Figure 17: Dowel-Laminated Timber

Source: *Urban Machine*

Demand: The justice-involved community requested opportunities for training and green jobs during community engagement workshops.

Workers: occupations include:

- woodworkers
- entrepreneurs

Training:

- Woodwork Career Alliance of North America offers five credentials within their national woodworking certificate
- Entrepreneurship

Expertise:

- Peroba Reclaimed Wood
- Renaissance Entrepreneurship Center
- RichmondBUILD
- Rubicon
- Urban Machine

14. Surplus Food Rescue

Scope: Driven by Senate Bill 1383, which requires that 20% of edible food in California be diverted to feed people by 2025, efforts are underway to figure out how to salvage a larger portion of the 81,000 tons of food discarded by the business sector in Contra Costa County each year.[26,27]

Through SB 1383, CalRecycle requires large food waste generators to develop contracts with food recovery organizations to channel surplus food to those who are food insecure. Food waste generators include:

- Tier 1 generators – supermarkets, grocery stores, food service providers (institutional, governmental, commercial, or industrial), food distributors, and wholesale food vendors
- Tier 2 generators – restaurants with >250 seats, hotels, health facilities, large venues, large events, and schools

Many non-profits involved with food recovery operate on a volunteer model. In Contra Costa County, White Pony Express (a 501(c)(3) organization located in Pleasant Hill) provides collection services to food generators at no cost using a team of volunteers. White Pony is funded through grants and government contracts.

In Richmond, food pantries and soup kitchens receive food donations from individual generators and through the Food Bank of Contra Costa and Solano. The recipients include shelters primarily serving unhoused residents, such as the Greater Richmond Interfaith Program and the Bay Area Rescue Mission.

Demand: CalRecycle's SB 1383 requirement to divert 20% of edible food to feed people by 2025

Workers: people with expertise in logistics and food safety issues

Training: eight-hour food safety training from the County Health Department

Expertise:

- RecycleMore
- White Pony
- Food Bank of Contra Costa and Solano
- Greater Richmond Interfaith Program
- Bay Area Rescue Mission
- Richmond Emergency Food Pantry
- Brothers of International Faith
- Catholic Charities East Bay Richmond Pantry
- Maen Mahfoud, RePlate – a non-profit fee-for-service model
- David Hott, Loaves & Fishes – may be able to expand the A La Carte food truck model to West Contra Costa County
- Yuka Nagashima, Executive Director of Food Shift – provides consulting services on food recovery and job training
- Plant to Plate

Organizations in the Community Produce and Mobile Pantry Program:

- Living Hope Neighborhood Church, 2800 Rheem Ave
- Nevin Community Center, 598 Nevin Ave
- Sojourner Truth Presbyterian Church, 2621 Shane Dr
- Veteran's Memorial Hall, 968 23rd St
- West County Courthouse, 39th St & Bissell Ave
- Booker T. Anderson Center, 960 S 47th St
- Kennedy High School, 4300 Cutting Blvd
- North Richmond Missionary Baptist Church, 1427 Fred Jackson Way
- Richmond Civic Center (Drive-Thru), 24 Barrett Ave & 25th St
- Southside Church of Christ, 1501 Florida Ave
- West Contra Costa Adult Education, 5625 Sutter Ave
- Able Community Development Foundation, 1963 Carlson Blvd
- Beacon Light Seventh-day Adventist Food Pantry, 607 S 19th St
- Corrine Sain Senior & Family Community Center, 515 Silver Ave
- Ephesians Community Development Center (Drive-Thru), 2887 Foothill Ave
- LifeLong William Jenkins Health Center, 150 Harbour Way
- Living Hope Neighborhood Church, 2800 Rheem Ave
- Men and Women of Valor, 1350 Kelsey St
- Multicultural Institute, 3600 MacDonald Ave
- New Gethsemane COGIC, 2100 Roosevelt St

- North Richmond Missionary Baptist Church Pantry, 1427 Fred Jackson Way
- Providence Baptist Church, 314 S 12th St
- Richmond Emergency Food Pantry, 2369 Barrett Ave
- Sojourner Truth Presbyterian Church (Drive-Thru), 2621 Shane Dr
- St. John Missionary Baptist Church, 662 S 52nd St
- Support Life Foundation: Richmond, 1110 36th S.
- True Fellowship Baptist Church, 1213 Fred Jackson Way

Green Infrastructure and Urban Forestry

Restoring the health of natural systems such as forests and shoreline is important so that when a shock or natural disasters strikes these systems can more easily bounce back. When these natural systems are healthy they improve residents' health, and protect nearby buildings and other human infrastructure.

15. Expanding the Urban Tree Canopy

Scope: Trees and green spaces in urban areas provide multiple benefits to people who live nearby: they reduce air pollution that contributes to respiratory ailments, create a calming environment, enhance mental functioning, and reduce crime. A review of 45 research papers found that the presence of green spaces, including parks and trees, reduced crime in urban areas. One study determined that buildings surrounded by trees and other vegetation saw 52% fewer crimes reported, compared to those with low levels of vegetation.

A vast canopy of 22,000 trees spreads across Richmond's 33.7 square miles, but there is room for more: a field survey by Richmond's Urban Greening Master Plan determined space is available for an additional 13,000 trees within the public right of way.

Groundwork Richmond has expressed interest in locally growing tree seedlings into mature street trees, which they and other non-profits would plant throughout the city.

Demand: During the community survey, residents specifically requested more trees, as did workers within the 23rd Street commercial district and other parts of Richmond.

Workers: occupations include:

- Arborists
- Crew leaders
- Groundworkers
- Plant nursery workers

Training: urban forestry (care and management of trees)

Career pathways: https://www.vibrantcitieslab.com/guides/career-pathways-exploration-guide/

Expertise:

- Groundwork Richmond
- Pogo Park
- Richmond Trees
- Trust for Public Land
- YES Nature to Neighborhoods

16. Living Levee

Scope: Infrastructure and operations on the Bay side of Richmond are vulnerable to rising sea levels and storm surges. Infrastructure under threat include the West County Wastewater District wastewater treatment plant, Republic Service's solid waste transfer station and sanitary landfill, Chevron's oil refinery, the Richmond Parkway, and the railroad, as well as nearby residential communities.

Planning is underway for the North Richmond Shoreline Living Levee project, which will protect the city by slowing storm-surge waters and absorbing floodwaters. A design with an engineered core and vegetated soil sloping down to the Bay will also provide migration space for plants and animals as the ocean level rises over time.

With a $644,709 grant from the San Francisco Bay Restoration Authority, the Watershed Project and the West County Wastewater District are implementing the North Richmond Shoreline Living Levee Planning and Preliminary Design Project in western Contra Costa County. The design project consists of:

- conducting technical studies and data collection
- developing a conceptual design and estimating associated costs
- determining appropriate offshore habitat restoration activities, such as oyster reefs and eelgrass beds to absorb wave energy
- engaging the public, key stakeholders, and the regulatory community in the initial phases to determine feasibility and alignment

Once design is completed, the next phases will involve permitting and construction. Part of the construction includes growing the estimated 50,000 native plants (which could be done in Richmond) needed for the levee's slope.

Demand: Industries and agencies along the shoreline seek infrastructure improvements for protection from storm surges and rising sea levels.

Workers: occupations include:

- Planners
- Community engagement specialists
- Plant nursery workers
- Construction workers

Training: U.S. Army Corps of Engineers - levee safety and levee design training

Expertise:

- Friends of Five Creeks
- Groundwork Richmond
- The Watershed Project
- West County Wastewater District

Land Use

Richmond has 442 brownfield sites with soil contaminated from historic industrial and military pollution, as well as two Superfund sites. This soil contamination is a drag on economic development. While the federal and state government offer financial and technical resources to clean up such sites, the City of Richmond's capacity to oversee these labor-intensive projects, from proposals to contracts and report writing, is limited. In addition, Richmond residents have witnessed an unsuccessful cleanup effort that left many wondering if excavation of hazardous materials and hauling them offsite is the right approach for brownfields remediation.

17. Brownfields Research & Innovation Hub

Scope: Cleaning of sites to levels appropriate for future use of the property requires technical expertise, funding, and skilled cleanup teams. Risk-based cleanup levels shown in Figure 18 helps explain that clean up levels for sites that will host homes is higher than sites that will contain industrial activities.

Figure 18: Soil Clean-Up Level Based on End Uses

Source: U.S. Environmental Protection Agency[28]

While site cleanups are important for economic development, the process of cleaning them up is time-consuming, expensive, and may contaminate nearby areas. Technical brownfields revitalization experts have stated that it's not always clear which remediation techniques are most effective.

Removal of hazardous soil and transfer to a different site runs the risk of contaminating the surrounding area and exposing others to the hazards. This is not a problem limited to Richmond. Many other low-income and disadvantaged communities suffer similar burdens of historic pollution, and questions remain about the best cleanup strategy.

Establishing a research and innovation center for brownfields cleanup would expand society's knowledge about which remediation techniques are most effective. A list of U.S. Environmental Protection Agency remediation technologies[29] that could be studied and compared include:

- Activated carbon (AC)-based technology
- Air sparging
- Bioreactor landfills
- Bioremediation
- Combined remedies
- Electrokinetics
- Evapotranspiration covers
- Ex situ thermal treatment
- Fracturing for environmental site remediation
- Groundwater circulating wells
- Horizontal remediation wells
- In situ chemical oxidation
- In situ chemical reduction
- In situ flushing
- In situ thermal treatment
- Multi-phase extraction
- Nanoscale materials for environmental site remediation
- Natural attenuation
- Remediation optimization
- Permeable reactive barriers
- Phytotechnologies
- Soil vapor extraction
- Soil washing
- Solidification and stabilization
- Solvent extraction

If a local Brownfields Research and Innovation Hub were established, the center could showcase, collect data about, and analyze the effectiveness of various soil clean-up technologies for the most common soil contaminants: petroleum hydrocarbons, asbestos, arsenic, heavy metals, polyaromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and pesticides such as dieldrin and DDT.

Having its own Hub to study the most effective remediation technologies could help shine a spotlight on Richmond, an environmental justice community with a long industrial history, and attract more resources for cleanup efforts.

Demand: Brownfield cleanups will help revitalize the community by putting sites back into productive use, which would attract new jobs and provide new revenue paths for the city.

Workers: environmental remediation occupations:

- Management and business specialist occupations
- Science occupations (biologists, hydrologists, chemists, conservation)
- Engineering and mapping occupations
- Construction and material-moving occupations

Training: 40 hours of training on OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standards, soil remediation technologies

Expertise:

- Center for Creative Land Recycling – technical and funding assistance for site cleanup
- Department of Toxic Substances Control – technical and funding assistance for site cleanup
- Microvi – Hayward-based company with a computational platform to predict the complex, dynamic interactions between microbial ecosystems and hazardous organic components in groundwater
- OndoVia – Hayward-based company with test kits for fast, easy laboratory-grade water analysis
- Picoyune – Berkeley-based company of highly portable sensors that measure mercury levels in the water and air
- UC Berkeley Richmond Field Station Environmental
- UC Berkeley Superfund Research Program – studying in situ remediation without transporting valuable soil and destroying persistent chemicals that are resistant to remediation

Water

As a city located on a peninsula, Richmond has a close connection to water. The "blue" in the Richmond Green-Blue New Deal represents several opportunities for water-related projects in technology development, port development, boats, and ecotourism.

18. Blue Tech Incubator and Accelerator

Scope: A startup is an organization formed to search for a repeatable and scalable business model. A startup incubator nurtures early-stage entrepreneurs and helps them develop their business ideas. Next, an accelerator helps startups rapidly scale up to more established products and services.

Given Richmond's 32 miles of shoreline, it makes sense to host an incubator and accelerator to support development of ocean-based technologies. Coworking space CoBiz in downtown Richmond could host incubators and accelerators that help entrepreneurs develop technologies for water-based agriculture, robotics, environmental restoration, and marine electric-power systems. Topics covered by incubators and accelerators may include idea development, product development, pitching, market fit, fundraising, customer acquisition, and exit strategies.

Workers: technology entrepreneurs

Training: staff could be mentored by other Bay Area tech accelerators

Expertise:

- Clean Tech Open – to find, fund, and foster entrepreneurs who have ideas for solving environmental and energy challenges
- CoBiz Richmond co-working space
- Renaissance Entrepreneurship Center
- The Rain Makers – incubator
- UC Berkeley SkyDeck Accelerator

19. Port Upgrades Including Electrification

Scope: Over the past century, Richmond's deep-water port has seen a lot of historically important activity. In the 1920s, tidelands were filled in and the harbor dredged to accommodate the Ford Motor Assembly Plant and the Felice and Perelli Cannery. In 1941, the Kaiser Richmond Shipyards were established and grew to become the largest wartime shipbuilding operation on the West Coast. A boomtown atmosphere attracted tens of thousands of workers to support the war effort and caused Richmond's population to swell from 23,600 in 1940 to 93,700 in 1943.

Nearly 80 years after the shipyards closed, the Port of Richmond is ready to upgrade city-owned and privately-owned terminals for today's clean-energy and sustainable transportation standards. Upgrades would allow the port to accommodate heavier cargo loads, allow visiting vessels to plug into electric shore power, and host additional advanced manufacturing activities.

Federal, state, and regional grant funding is available to implement Clean Air Action Plan strategies, which will reduce air pollutants such as nitrous oxides, sulfur oxides, particulate matter, and toxic air contaminants. These investments will help reduce emissions from ocean-going vessels, railroad equipment, trucks, and automobiles, using the best available technologies.

If the City of Richmond establishes a manufacturing hub for West Coast offshore wind activities, the port upgrade is estimated to require $375 million of public and private investment. Making these investments could attract hundreds of port upgrade construction jobs followed by hundreds of offshore wind manufacturing career-length jobs. The State of California plans to spend $2.3 billion on port improvements, roughly on par with federal funding for the nationwide Port Infrastructure Development Program (PIDP).

Demand: To reduce air pollution at ports, vessels are required to plug into electric shore power or capture and control emissions when sitting at port. Container, refrigerated cargo, and cruise ships have been included since 2014. These regulations will also apply to auto carriers starting in 2025 and oil and fuel tankers in Northern California starting in 2027.

Workers:

- International Association of Sheet Metal, Air, Rail and Transportation Workers (SMART)
- International Brotherhood of Electrical Workers (IBEW)
- International Brotherhood of Teamsters (Teamsters)
- International Longshore and Warehouse Union (ILWU)
- Laborers' International Union of North America (LIUNA)
- North America Building Trades Union (NABTU)
- United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry (UA)

Training: union provided

Expertise:

- City of Richmond, Port of Richmond staff
- Labor unions

20. Berthing Vessels at the Port

Scope: According to Richmond's Working Waterfront, the U.S. Department of Transportation's Maritime Administration (MARAD) is looking for a $3 million per year lay berth arrangement to park ships. The National Oceanic and Atmospheric Administration (NOAA) is also searching for berthing space. Richmond could participate in a regional plan the Marine Exchange will set up to market lay berth space.

Richmond has several locations that could compete for MARAD's Ready Reserve fleet moorings. Alameda currently berths two such vessels, fetching that City some $3 million per year. MARAD will issue requests for proposals for new berthings over the next one to two years, given that Alameda-based vessels must move because of low water levels.

The NOAA West Coast home port is Portland, Oregon, but their ships regularly visit the Bay Area. Richmond could make a bid to home-port NOAA vessels when in the Bay Area. The city would take advantage of the agency's mission to study ocean health and the effects of climate change, and in doing so, the city could educate youth about related opportunities. Furthermore, NOAA is working to diversify its staff, and closer ties to Richmond would help engage youth to consider environmental science careers.

Demand: MARAD and NOAA are looking for locations for fleet moorings

Workers: Port of Richmond staff

Expertise:

- MARAD
- NOAA
- Port of Richmond
- Working Waterfront

21. Boatbuilding

Scope: Rosie the Riveter, one of the most famous icons of the can-do spirit of World War II, worked in Richmond's shipyards. Mayor Eduardo Martinez is interested in exploring the return of shipbuilding to Richmond, whether local boatbuilding capacity for electric or wind-powered vessels or some of the many different types of boats needed to support the growing offshore wind industry on the West Coast.

Globally, offshore wind is expanding in Europe, Asia, and North America. The World Economic Forum expects global capacity of large-scale wind farms to increase 10-fold, from 34 GW in 2020 to 330 GW in 2030, and spread throughout 24 countries. A portion of the expected $1 trillion of investment between 2020 and 2030 will go into building vessels for constructing, operating or maintaining offshore wind farms. Figure 19 shows the kinds of vessels needed.

Figure 19: Offshore Wind Boat Types and Specifications

Vessel Type	Representative Vessel	Propeller Engine Rating (kilowatts [kW])	Auxiliary Engine Rating [kW]	Specification Sheet Source(s)
Scour protection vessel	Bravenes (Van Oord)	Main: 6,200	3,194	Van Oord (2021)
Crew transfer vessel	CTV1 (Patriot)	Thruster: 7,000	50	Patriot Offshore Maritime Services, EPA (2023a)
Cable lay vessel	Leonardo da Vinci (Prysmian Group)	2,066	3,194	Prysmian Group (n.d.)
Anchor handling tug supply	Normand Sagaris (Solstad Offshore)	Main: 6,200	8,400	Solstad Offshore (n.d.)
Tugboat	EPA tugboat classification	Thrusters: 7,000	191	EPA (2022)
Service operations vessel	T60-18 (IHC)	17,400	5,370	IHC Offshore Energy (2021)
Feeder barge	Superfeeder (MINO Marine)	2,536	6,800	Moore (2020)
Heavy lift vessel	Bokalift 2 (Boskalis)	5,720	34,560	Boskalis (2022)
Wind turbine installation vessel	Charybdis (Seajacks)	Main: 7,500	34,560	Seajacks (2023)
Deck carrier vessel	Boldwind (UWL)	Thrusters: 2,400	Not considered	United Wind Logistics (n.d.); Ship Technology (2019)

Source: *National Renewable Energy Laboratory*[30]

Demand: Globally there are not enough specialized boats available for all the offshore wind turbine development planned for the next few decades.

Workers: engineers, designers, and skilled trades (shipfitters, machinists, welders, metalworkers, caulkers, tool and die makers, pattern makers, core makers, pipefitters, boilermakers, carpenters, electricians, electronics technicians, painters, and sheet metal workers)

Training: for skilled shipbuilding trades - apprenticeships with classroom and on-the-job training

Expertise:

- American Boatbuilders Association
- American Society of Naval Engineers
- International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers, and Helpers
- Society of Naval Architects and Marine Engineers
- United Marine Manufacturers Association

22. Training Center for Boat Maintenance and Repair

Scope: Marine mechanics are responsible for maintaining and repairing electrical and mechanical equipment onboard a ship. The work to troubleshoot engine problems, perform preventative maintenance and assemble or disassemble engines is usually performed using hand, power, or pneumatic tools, and computerized analytic and diagnostic equipment. Classroom and on-the-job training prepare students to work on different types of boats.

Marine mechanics for commercial vessels and ferry boats are in high demand. Water Emergency Transportation Authority (WETA) is open to collaborating with the Working Waterfront Coalition and possibly providing space for training cohorts for boat maintenance and repair. Organizers are currently looking for locations for a network of training facilities.

Demand: There is unmet demand for trained marine mechanics.

Workers: marine mechanics

Training: The Marine Trade Skills Program provides certificates in boat repair, diagnostics and maintenance.

National Expertise:

- Association of Marine Technicians
- Centers for Ocean Sciences Education Excellence

23. Shoreline Ecotourism

Scope: Along Richmond's coast, the 2,315-acre Point Pinole Regional Shoreline park provides a home to more than 100 animal species, including deer, monarch butterflies, hawks, and owls. Salt marshes along the shoreline bluffs host a variety of shorebirds and crabs. The park has rich birdlife, including many ducks and shorebirds and the endangered black rail. Many migratory bird species are also seen, as the park is located on the Pacific Flyway.

Point Pinole Regional Shoreline contains a historical landmark for the former explosives factories, including the Giant Powder Company.

Also in Richmond is 276-acre Point Molate, located on the shores of San Pablo Bay. For thousands of years, Point Molate was home to Ohlone tribal groups. Between 1870 and 1912, the site was used as a Chinese shrimp camp. Between 1906 and 1920, it was the site of Winehaven, the offices and processing and storage facility of the California Wine Association. In 1942, the land was sold to the United States government and operated thereafter as a Navy base. Within Point Molate, there are currently 16 special-status plant species and 24 special-status animal species, including several raptors.

Both parks are ideal for hiking, picnicking, kayaking, horseback riding, bicycling, fishing, and crabbing, while taking in the beautiful views of the San Pablo Bay. Ecotourism opportunities include recreation rentals of kayaks, bicycles, and horses, as well as naturalist-led and downloadable guided tours about wildlife, natural features, historical places, and sacred sites of the Ohlone people.

Demand: Richmond residents have requested more recreational opportunities during surveys.

Workers: park rangers, naturalists, community outreach coordinators, wildlife specialists, educators, facilities managers, conservation scientists

Training: ecotourism and recreation

Local Expertise:

- East Bay Regional Parks District
- Point Molate Alliance

Other

One notable green jobs category involves green hydrogen. Given the large federal investments flowing into this space, this report would be remiss if it did not mention green hydrogen. However, a few important concerns about this opportunity would need to be addressed.

24. Green Hydrogen*

Scope: Several energy-intensive activities in the United States require large quantities of fossil fuels and are difficult to decarbonize: long-haul flights, long-haul trucking, steel manufacturing, and ammonia production for fertilizer. These industries contribute relatively large percentages of greenhouse gas emissions.

In October 2023, the U.S. Department of Energy announced $7 billion in funding to launch seven Regional Clean Hydrogen Hubs across the nation to accelerate commercial-scale deployment of low-cost clean hydrogen. California received funding to support one of these seven hubs.

*Concerns that need to be addressed: While hydrogen offers the potential to decarbonize major greenhouse gas-emitting activities, a few key safety and environmental concerns will need to be worked out.

First, hydrogen is flammable and explosive, so Richmond community leadership must decide if the economic benefits of scaling up hydrogen production outweigh the health and safety risks to the community. Second, the majority of hydrogen production comes from natural gas, which makes it brown hydrogen, an environmentally damaging form.

In order to produce green hydrogen, large quantities of renewable energy will be needed within the regional electricity grid where the hydrogen is being made so that it does not compete with other users of green electricity.

If these important concerns can be addressed and the community feels the benefits outweigh the risks, then green hydrogen might be a candidate for green job creation in Richmond.

Demand: Global air travel and transport is responsible for 3.5% of greenhouse gas emissions worldwide; medium- and heavy-duty trucks contribute 6.7% of greenhouse gas emissions in the U.S.; steel manufacturing creates 5% of global greenhouse gases; and ammonia generates 1% of global greenhouse gases. These four activities could be powered by green hydrogen, meaning hydrogen made with renewable energy.

Workers: for building a new electrolytic hydrogen facility: engineers; metal workers and assemblers; production occupations; plant and system operators

Training: health and safety training; other training

Local Expertise:

- Chevron
- International Brotherhood of Boilermakers (Boilermakers)
- Raven SR
- United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry (UA)

SECTION V
Workforce Development and Training

What training will be useful to upskill the labor force of today for the green-blue jobs of tomorrow? The answer depends on the types of jobs predicted to be in demand in growing industries. Economic development forecasting as well as government environmental policies influence public and private investment that enable job creation. These factors shine a light on the road ahead for green projects and the skillsets those projects will need.

The Contra Costa Just Transition Plan studied economic development forecasting for the county and determined that growth is expected in six industries:

- Advanced materials and diversified manufacturing
- Clean tech
- Advanced transportation technology
- Biomedical/biotech
- Food processing
- Other sectors that support the green energy economy and the shift to a zero-emission economy

Of this list, advanced manufacturing, clean tech, advanced transportation technology, and the other sectors that support the green energy economy overlap with some of the green-blue jobs recommendations in this report.

Another way to look for guidance about workforce development training that will be needed is to study environmental policy goals set at the federal, state, and local levels which are outlined in the Gap Analysis which can be found in Appendix IV. Government agencies have developed ambitious goals for energy, buildings, transportation, consumer goods, and nature, all goals that are steering our society toward a more just, equitable, resilient, and sustainable future. These policy goals are driving public and private investment in green industries that will need trained and skilled workers.

What Is Workforce Development?

Workforce development describes career-related services for individuals seeking to improve their earning potential and career options by developing their skills and/or increasing their education levels, or by obtaining certifications or licenses relevant to their industry.

Additional years of experience, as well as professional development to learn new skills or information, helps an individual progress along their chosen career path. Generally, careers progress along a trajectory from entry-level to expert, and here we define some of the key aspects of each level:

- Specialization or expert roles – deepening expertise in a particular skill or area
- Executive or leadership roles – these roles have significant responsibility for the overall direction and success of an organization
- Senior-level or management positions – in these positions, individuals are responsible for decision-making, leadership, and overseeing teams or departments
- Mid-level – as individuals gain experience and skills, their roles involve more responsibility and may require specialized knowledge
- Entry-level

This upward trajectory can take many different paths, depending on workers' interests and skills as well as the training and job opportunities available in their region.

To convey the broad brushstrokes of green career pathways, Figure 20 outlines pathways for six sectors relevant to green jobs: construction, building deconstruction, electrical contracting, advanced manufacturing, business entrepreneurship, and urban forestry.

Figure 20: Simplified Career Pathways for Six Green Job Sectors

Sector	Minimum Educational Entry Point	Career Pathway
Construction	High school diploma or GED	• Owner of construction firm • Supervisor or manager • Journeyperson • Exam and license • Apprentice – on-the-job and classroom training
Building Deconstruction	Some high school	• Move to construction career pathway • Apprentice or entry-level • Building deconstruction training and accreditation
Electrical Contracting	High school diploma or GED	• Owner of electrical contracting firm • Master electrician • Specialized continuing education and professional development • Journeyperson electrician • Exam and license • Apprentice – on-the-job and classroom training
Advanced Manufacturing	High school diploma or GED	• Business owner • Manager or vice president • Supervisor or technical specialist • Technician, assembler, associate, or clerk
Business Entrepreneurship	High school diploma or GED	• Growth • Hiring • Funding • Business planning • Entrepreneurship classes
Urban Forestry	High school diploma or GED	• Business owner • Supervisor or manager • ISA certified arborist – requires bachelor's degree • Urban forester • Foreman or crew leader • Tree climber • Groundworker

Note the minimum educational requirement for each sector as the entry point. Workers can then move up the career ladder as they gain more education, training, credentials, and experience.

Each sector has demand for many different types of skills. For example, within construction, building electrification, and energy efficiency, projects need workers

with business skills in management, finance, marketing, sales, and administration, as well as technical skills in engineering, construction, installation, management, and repair.

Job classifications that house different types of skills relevant to green jobs, as organized by the Bureau of Labor Statistics, are shown in Figure 21.

Figure 21: Standard Occupational Classifications (SOC)

SOC #	Category
11-0000	Management Occupations
13-0000	Business and Financial Operations Occupations
15-0000	Computer and Mathematical Occupations
17-0000	Architecture and Engineering Occupations
19-0000	Life, Physical, and Social Science Occupations
21-0000	Community and Social Service Occupations
23-0000	Legal Occupations
25-0000	Educational Instruction and Library Occupations
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations
35-0000	Food Preparation and Serving Related Occupations
37-0000	Building and Grounds Cleaning and Maintenance Occupations
39-0000	Personal Care and Service Occupations
41-0000	Sales and Related Occupations
43-0000	Office and Administrative Support Occupations
45-0000	Farming, Fishing, and Forestry Occupations
47-0000	Construction and Extraction Occupations
49-0000	Installation, Maintenance, and Repair Occupations
51-0000	Production Occupations
53-0000	Transportation and Material Moving Occupations

For the 24 green-blue projects recommended in this report, training to learn new technologies and systems are needed, as well as training in established skillsets.

Skill Development

See Figure 22 for distinctive skillsets required for each recommended RGBND project, with details about who currently offers this type of training.

Figure 22: Distinctive Skills Needed for Recommended Green-Blue Projects

	Project	Skills	Technology or system	Who offers training
1	**Solar emergency microgrid**	Microgrid design, installation	Microgrid systems (solar photovoltaics, batteries, monitoring, communications and controls)	UC San Diego Extended Studies – microgrid design, IBEW Electrical Joint Apprenticeship Training Centers
2	**Battery manufacturing**	Production, quality assurance	Energy storage systems	UC San Diego Extended Studies – electrical energy storage
3	**Offshore wind turbine manufacturing**	Production, quality assurance, health and safety	Depends on the wind turbine part	Global Wind Organisation, Massachusetts Maritime Academy
4	**Building electrification retrofits**	Electrical installation	Heat pumps for water heating and HVAC	IBEW Electrical Joint Apprenticeship Training Centers, Pacific Gas & Electric Energy Training Center
5	**Green accessory dwelling units and tiny homes**	Construction	Small pre-fabricated housing units	Big Skills Tiny Homes, UA Green Professional Building Skills Certificate, Diablo Valley College, Cal State East Bay
6	**Community land trust**	Contracts, financing	Cooperative ownership	Cooperation Richmond, Sustainable Economies Law Center, Project Equity, Renaissance Center
7	**Destination downtown**	Business plans, finance	Co-located manufacturing, retail, and cooperative businesses	Renaissance Center, Cooperation Richmond
8	**Transportation management association**	Community engagement, transportation demand management	Transportation demand management	Association of Commuter Transportation, Community-based social marketing

9	**Transition to zero-emission vehicles**	Installation, maintenance, and repair of electrical systems	Electric vehicle charging infrastructure, zero-emission vehicles	Electrical Vehicle Infrastructure Training Program, IBEW Electrical Joint Apprenticeship Training Centers
10	**Building deconstruction firms**	Building deconstruction	Disassembling buildings and sorting by material	Build Reuse
11	**Building salvage warehouse**	Business plans, inventory management, finance	Inventory management	Renaissance Center
12	**Richmond remakery and fixery**	Teaching, repair of electronics, appliances, clothing, and small devices	Appliances and equipment	iFixit
13	**Re-entry entrepreneur**	Woodworking, business plans	Power tools	Renaissance Center, RichmondBUILD
14	**Surplus food rescue**	Food handling safety, logistics	Logistics	California Food Handlers Safety training
15	**Expanding the tree canopy**	Tree climbing, tree care	Urban forestry	Merritt College
16	**Living levee**	Landscape design, levee construction	Protective levee systems	US Army Corps of Engineers
17	**Brownfields research and innovation hub**	Research on environmental management	Soil cleanup	UC Berkeley Extension certificate in environmental management
18	**Blue tech incubator and accelerator**	Business plans, finance	Entrepreneurship	Renaissance Center
19	**Port upgrades, including electrification**	Electrical installation	High-voltage electric charging systems	IBEW Electrical Joint Apprenticeship Training Centers
20	**Berthing vessels at the port**	Port management	Berthing plans and berthing aid systems	ILWU Longshore union
21	**Boat building**	Production, quality assurance	Marine vessels	Consult US-based boat manufacturers

22	**Training center for boat maintenance and repair**	Teaching, boat maintenance, and repair	Commercial vessels and ferries	Marine Trades Training Program
23	**Shoreline ecotourism**	Teaching	Ecosystems	Nature-based education training
24	**Green hydrogen**	Production, health and safety	Hydrogen production	Occupational Safety & Health Administration

In addition, regional utilities such as Pacific Gas & Electric (PG&E) and East Bay Municipal Utilities District (EBMUD) offer extensive training opportunities. PG&E provides more than 400 educational resources to help clean energy workers and job seekers in California expand their technical skills. PG&E's Energy Training Center and Power Pathway webpages provide details. Similarly, the East Bay Municipal Utilities District offers a variety of paid internship and training programs as part of its long-term workforce development strategy to attract, recruit, and retain a diverse, qualified workforce. By collaborating with utilities on training for the green energy and water careers of the future, the City would help expand opportunities for Richmond residents.

RichmondWORKS also looks for ways to help develop the local workforce. They serve a vital role providing skill development for people looking for a career onramp. Through pre-apprenticeship training on soft skills and other skills, they prepare workers for apprenticeships and jobs.

Overcoming Barriers

While studying opportunities for green job creation in Richmond, a few solutions were suggested that would address barriers along the career pathways to high-road jobs for unlicensed contractors and members of the re-entry population. A few community members advocated for the benefits of providing career development training in Spanish for unlicensed contractors. Training to become licensed contractors would enhance job-site safety, public safety, boost income of workers, and increase city permit revenues that would be reinvested in the community. Educating the public about these efforts would reduce the underground job market and enhance the visibility of the local workforce.

The re-entry population possess valuable skills sets that local employers need to fill vacancies but they face multiple challenges when seeking employment after

serving time. The City of Richmond sought to address this issue through the 2013 Ban the Box Ordinance No. 14-13 which supports qualified individuals seeking employment within Richmond by ensuring that all are given equal opportunity to apply for available positions. The State of California reinforced Richmond's position on this with its 2018 Ban the Box Law, also known as the California Fair Chance Act, which prohibits employers from asking about conviction history before making a job offer. Employers must consider a job candidate's qualifications first by removing conviction and arrest history questions from job applications and delaying background checks until later in the hiring process.

Workers in less-skilled and technical occupations are the target audiences for RichmondWORKS training to help workers move toward their career goals. Figure 23 describes the onramp for four different types of employment.

Figure 23: Skill Development by Type of Employment

Employment	Entry-level Inclusion Paths	Foundational Training and Education	Incumbent Worker Skill Upgrades
Less-skilled occupations	Pipeline programs for inclusion	No post-secondary education requirement	Skill upgrade training via industry training partnership
Technical occupations	High school to community college support	Community college, Associate's degree, technical certification, apprentice classroom learning	Skill upgrade training via industry training partnership
Apprenticed occupations	Pre-apprenticeship programs for inclusion	Certified apprenticeship, journey card	Journey upgrade training via industry training partnership
Professional occupations	High school to 4-year college support, community college to 4-year college support	4-year university – bachelor's degree or graduate degree	Continuing education via 4-year university or professional association

Source: *National Renewable Energy Laboratory*[31]

Training for the last two categories in Figure 23, apprenticed occupations and professional occupations, are already well developed. Trade unions provide classroom and on-the-job training for certified apprenticeships for career pathways such as electricians and in the construction trades. Four-year colleges and universities provide support for professional occupations that require a licensing exam, such as engineering and architecture.

Existing Training

In Contra Costa County and nearby, the following training and credentials are available to prepare less skilled or technical workers for green-blue jobs in the near future.

Figure 24: Examples of Training Currently Available

	Sector	Job Titles and Training	Potential Projects
1	**Renewable Energy**	**Sample job titles:** • Robotics Technician • Maintenance Manager • Master Production Scheduler **Existing training programs:** • Construction Laborer - RichmondBUILD and Richmond YouthBUILD • Electrician – International Brotherhood of Electrical Workers (IBEW) • Geological Technicians, except Hydrologic Technicians – Contra Costa Community College (CCC) Certificate of Accomplishment or Associate's degree (AA or AA-T) • Pipefitter - union training • Solar Installer – community-based organizations (CBOs) • Welder - union training	• Battery manufacturing (advanced manufacturing) • Microgrid installation • Offshore wind turbine manufacturing
2	**Building Electrification and Energy Efficiency**	**Sample job titles:** • Electrician • Powerline Worker **Existing training programs:** • Carpenter - RichmondBUILD and Richmond YouthBUILD • Construction Laborers - RichmondBUILD and Richmond YouthBUILD • Electrician – IBEW • Energy Auditors - Rising Sun Center for Opportunity • Energy and Renewables – Pacific Gas & Electric Energy Training Center • Engineers - CCC and California universities • Plumbers - union training • Roofers - union training • Welder - union training	• Building electrification, energy efficiency and energy demand management (supporting equitable transition of existing buildings to resilient and healthy homes) • Construction of accessory dwelling units, tiny homes, and prefabricated homes (also encourages new green residential and commercial developments)

3	**Sustainable Transportation**	**Sample job titles:** • Electric Vehicle Mechanic • Electrician (with electric vehicle certification) **Existing training programs:** • Automotive Hybrid Technician – CCC • Automotive Program – CCC • Automotive Technology – Associate's degree at Los Medanos College • Bicycle Repairers - CBOs • Electrician – IBEW • Maintenance and Repair Workers - General Automotive Collision Repair - CCC	• Transition to zero-emission vehicles (including mass transit and active mobility) • Destination downtown (supporting and attracting a cluster of additional businesses in a downtown area to attract visitors)
4	**Zero Waste**	**Sample job titles:** • Recycling Sorter and Operations • Recycling Reclamation Workers **Existing training programs:** • Engineers - CCC and California universities • Freight Truck Driver/Garbage Truck Driver – CCC	• Building salvage warehouse (supporting increased recycling and reuse of construction and demolition materials) • Richmond remakery and fixery (bringing together "fix-it" clinics, maker enrichment classes for children, and Richmond's Tool Lending Library)
5	**Green Infrastructure and Urban Forestry**	**Sample job titles:** • Tree Trimmers/Climbers **Existing training programs:** • Arborists - CBOs • Engineers - CCC and California universities • Groundskeeper - Rubicon • Certified Landscape Technician – CCC and National Association of Landscape Professionals	• Tree planting (supporting expansion of Richmond's tree canopy) • North Richmond Living Levee (in collaboration with the County and regional partners)
6	**Water**	**Sample job titles:** • Geological Surveyor • Water Quality Technician **Existing programs:** • Electrician - IBEW • Engineer - Waterfrontjobs.com • Marine Mechanic - Waterfrontjobs.com • Plumber - union training • Tug and Ferry Deckhand - Waterfrontjobs.com • Welder - union training	• Boatbuilding, boat maintenance and repair • Upgrade Port of Richmond (electrification upgrades to reduce greenhouse gas emissions)

7	Other	**Sample job titles:** • Marketing Associate **Existing training programs:** • Accounting Technician, Loan and Credit Clerks, Tellers - Business certifications and AA degrees - CCC • Customer Service Representatives - Communication Studies AS at CCC • Engineers - CCC and California universities • Environmental Management certificate - UC Berkeley Extension • Shipping, Receiving and Inventory Clerks - FLOW training at CCC	• Blue and green tech incubators and accelerators • Brownfield research and innovation hub • Re-entry entrepreneurs • Building deconstruction firms • Shoreline ecotourism

When steering workers toward additional educational credentials, it's helpful to keep in mind the higher salaries workers can expect to command as a result. See Figure 25 for median salaries based on education level for Bay Area green job sectors.

Figure 25: Median Salaries by Green Sector (San Francisco Bay Area)

Education Level	Green Construction	Renewable Energy	Energy Efficiency & Carbon Capture	Manufacturing	Recycling & Waste Reduction	Agriculture & Forestry	Transportation
Master's degree	-	-	-	$125,000	$97,000	$105,000	-
Bachelor's degree	$102,000	$141,000	$125,000	$122,000	$128,000	$62,000	$114,000
Associate's degree	$70,000	$110,000	$98,000	$64,000		$46,000	$74,000
Post-secondary non-degree award	$65,000	$62,000		$75,000		$131,000	$59,000
High school diploma or equivalent	$76,000	$102,000	$102,000	$54,000	$50,000	$42,000	$68,000
No formal education credential	$49,000	$59,000	-	-	-	-	$44,000

Source: *Bay Region Green Jobs Exploratory Dashboard*[32]

The U.S. Department of Energy provides more detailed information about career pathways and salary ranges for entry-level, mid-level, and senior-level jobs in advanced manufacturing and construction. Note that highlighted positions require a minimum educational level of a Bachelor's degree in Figures 26 and 27.

Figure 26: Salary Ranges in Advanced Manufacturing (National)

	Production (Manufacturing)		Assembly & Fabrication (Packaging)		Distribution	
Advanced	**Assistant Plant Manager** $85–152,000	**Production Manager** $71–139,000	**VP Manufacturing & Operations** $200–300,000	**Operations Manager** $80–130,000	**VP Distribution** $71–200,000 **Business Development Manager** $68–137,000	**Distribution Manager** $77–155,000
Mid-Level	**Manufacturing Engineer** $62–175,000 **Production Supervisor** $58–99,000 **Quality Technician** $42–95,000 **Manufacturing Technician II** $57–96,000	**Electrical Engineer** $61–147,000 **Advanced Manufacturing Technician** $57–101,000	**Assembly Manager** $59–154,000 **Quality Control Inspector** $39–92,000	**Procurement Specialist** $47–103,000 **Assembly Supervisor** $52–122,000	**Distribution Supervisor** $54–111,000	**Distribution Engineer** $68–155,000 **Distribution Analyst** $59–114,000
Entry-level	**Manufacturing Technician I** $70–85,000 **Production Associate** $35–52,000 **Machine Operator** $36–52,000	**Maintenance Technician** $48–77,000 **CNC Machinist** $36–73,000 **Production Operator** $43–64,000 **Production Worker** $35–55,000	**Fabricator** $36–65,000 **Assembler** $32–45,000 **Welder** $45–60,000	**Packaging Technician** $37–52,000 **Electrical/ Electronic Assembler** $37–54,000	**Shipping-Receiving Clerk** $46–57,000 **Material Handler** $39–52,000	**Warehouse Associate** $32–45,000

Source: *U.S. Department of Energy* [33]

The progression from entry-level to mid-level, and then to advanced salaries in construction with advanced manufacturing, demonstrates the salary bumps available with more training and experience.

Figure 27: Salary Ranges in Green Building (National)

	Commercial Construction & Retrofitting			Residential & Multifamily Construction & Retrofitting		
Advanced	**Building Performance Contractor** pay varies **Commercial Building Code Official** $37–99,000 **Sustainable Consulting Supervisor LEED AP** $48–96,000	**Mechanical Electrical Plumbing Contractor** pay varies **Commercial Construction Manager** $56–165,000 **Indoor Environmental Health Specialist** $75–150,000		**Building/ Home Performance Contractor** pay varies **Residential Building Code Official** $37–99,000 **Multi-family Quality Control Inspector** $43–90,000	**HVAC Contractor** pay varies **Multi-family Retrofit Project Manager** $60–100,000	**Energy Efficiency Program Director** pay varies
Mid-Level	**Commercial Lighting Auditor** $50–100,000 **Insulation Journey person/ Mechanic** $32–89,000	**Commercial Energy Auditor** $55–105,000 **Product Sales Specialist** $50–135,000	**Commercial Construction Foreman** $45–110,000	**Residential Quality Control Inspector** $43–80,000 **Residential Energy Auditor** $43–106,000	**Healthy Home Evaluator** $43–106,000	**Multi-family Energy Auditor** $43–106,000 **Building Performance Crew Leader** $41–104,000
Entry-level	**Insulation Apprentice** $32–89,000 **Energy Efficiency Technician** $31–52,000	**Insulation/ Air Sealing Technician** $25–69,000		**Building Performance Installer** $24–52,000	**Energy Efficiency Technician** $37–52,000	**Energy Efficiency Sales Representative** $36–98,000 **Energy Efficiency Program Assistant** $23–54,000

Source: *U.S. Department of Energy*[34]

With the high cost of living in the Bay Area, workforce development is a vital resource to help workers access careers that offer family-sustaining wages, benefits, and career advancement opportunities.

High Road Training Partnerships

The California Workforce Development Board shares the City of Richmond's goal to help workers secure high-road jobs, as evidenced by its work on High Road Training Partnerships (HRTP).[35] This initiative was designed to address questions of income

inequality, economic competitiveness, and climate change to support economically and environmentally resilient communities. These partnerships encourage worker skill development and help firms compete based on their product and service quality, which is achieved through innovation and investment in workers.

Individual HRTPs relevant to green jobs that have developed policies and principles for high-road jobs in their industry include:

- California Water Wastewater and Energy
- Connecting Under-Represented Workers to High Road Jobs – includes justice-involved workers
- Contra Costa Harnessing Change: Refinery Transition Partnership – Just Transition Equity and Job Quality in Building Decarbonization – building electrification and energy efficiency
- Greater Sierra Forestry Corps – green infrastructure and urban forestry
- Humboldt High Road Wind (HRW) – renewable energy
- Ready, Set, Cook: Launch Your Culinary Career Program – zero waste
- TEAM GILLIG: A High Road Partnership Between Teamsters Local 853 and GILLIG – sustainable transportation
- West Oakland Job Resource Center Regional Transportation, Distribution and Logistics Workforce Institute and Expansion – sustainable transportation

The policies and principles that have been developed for each HRTP could be useful to RichmondWORKS when developing training for local workers.

Funding for Training

In support of green high-road job training, for RichmondWORKS to secure workforce development funds from federal and state government agencies, jobs must be available to workers upon completion of training. This is the case for some but not all of the 24 projects recommended in this report. For green jobs projects that require more preparation before they are ready to train and hire, foundations may be interested in providing support.

K-12 Environmental Education and Green Career Awareness

One final note about workforce development: during the RGBND community engagement process, a few community members recommended that development of talent for green careers and green career awareness start earlier. Raising

awareness among children in K-12 schools about a wide variety of green jobs that will be available in the future will help spark interest in studying certain subjects that will allow them to pursue specific green careers.

In elementary school, children learn about water, carbon and nitrogen cycles, ecosystems, and interesting plants and animals, information that provides the foundation of environmental education. That is just part of the equation, however. Hands-on experience, for example in school gardens, complements classroom learning.

In middle school, students can apply what they learn in multiple school subjects (such as science, math, and writing) to real-world environmental problems. This project-based learning helps the material come alive and drives budding interest in green careers.

Being exposed to emerging green technologies and a wide variety of viable green career paths during middle school and high school will light a fire in many students, who will then pursue their interests at community colleges or universities. Awareness of green careers continues in high school with specific training and applied projects in the community.

While environmental education basics are already part of the curriculum used in the West Contra Costa Unified School District, opportunities to expand curricula and teacher training exist. For those looking for inspiration about environmental education materials, Appendix III contains descriptions of K-12 environmental education curricula from around the country. This could be used to create a career readiness curriculum to be adopted by the School Board.

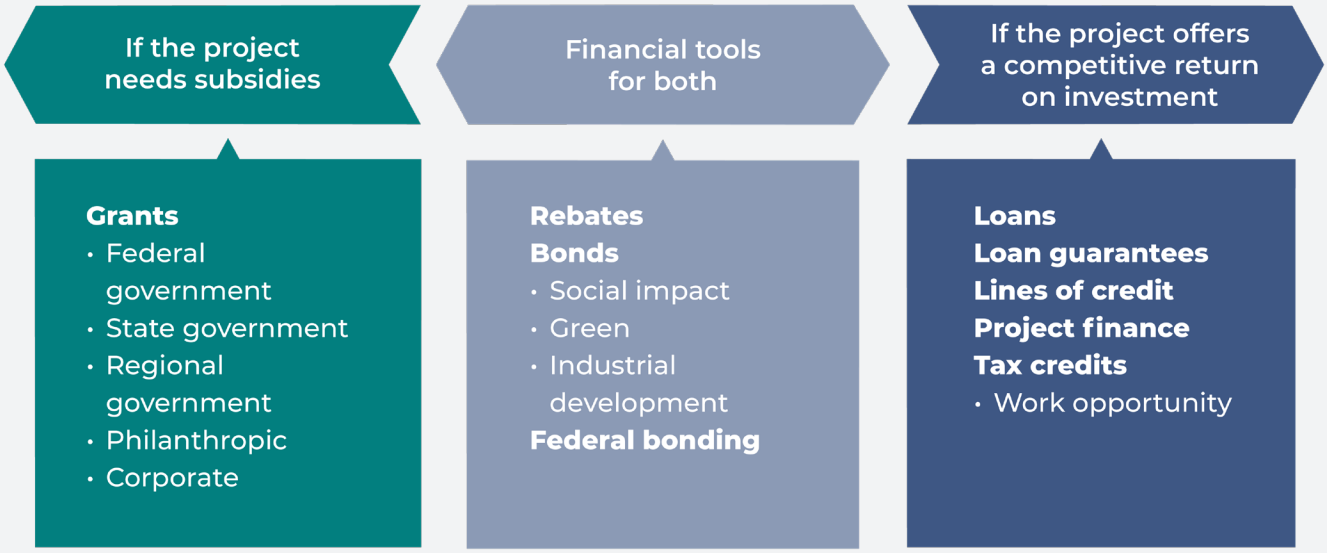
At the high school and community college levels, opportunities to expand technical training on emerging technologies and providing paid internship opportunities will encourage more students to pursue green careers.

As public funding appropriations and private investment become available for green projects, K-12 environmental education, community college technical training, and municipal and state workforce development efforts will prepare the workforce for the meaningful green jobs of tomorrow.

SECTION VI
Funding

Funding is central to moving a project along to the hiring stage. Where to look for funding depends on what the money is needed for: capital expenses (ex., land, buildings, equipment) or operating expenses (ex., salaries, utilities, office supplies). This section considers a variety of financial tools on the spectrum of financial returns from projects that need subsidies to those that provide a return on investment, as shown in Figure 28.

Figure 28: Spectrum of Financial Tools for Green Job Projects



For Projects That Need Subsidies

This section provides examples of financial tools for green projects that offer social and environmental benefits: government grants, corporate grants, philanthropic grants, rebates, funding for training, tax credits and exemptions, and bonding.

Government agencies, public foundations, and private foundations (individual, family, or corporate) make grants for charitable purposes. Government grants fund ideas and projects to provide services to the public and stimulate the economy. Public and private foundations offer grants in support of their preferred research or charitable objectives.

Government Grants

Federal grants

Trillions of dollars of economic investment is flowing to the state and local level from the federal government by way of the Inflation Reduction Act and Bipartisan Infrastructure Bill. The intent is to invest in communities and the working class while helping to reduce greenhouse gas emissions, support union labor, and encourage family-sustaining wages. To secure funding and earn tax credits, it's essential that projects applying for these grants adopt labor standards.

Guided by the White House Justice 40 Initiative, the federal government aims for 40% of certain federal investments to flow to disadvantaged communities that are marginalized, underserved, and overburdened by the effects of pollution. Details can be found in President Biden's Executive Order 14008. Justice 40 Initiative investment categories include: climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure.

Among government grant programs at the federal, state, and regional level, the only constant is that the list of those available is ever changing. Some opportunities are one-time while others are recurring. Databases offering information about government grants include:

- Federal government grants – Grants.gov database to search for federal grants
- Bipartisan Infrastructure Law – U.S. Conference of Mayors database of over 400 funding opportunities

- Inflation Reduction Act – Metropolitan Washington Council of Governments database of Inflation Reduction Act grants

The following federal agencies may have current grant programs relevant to green-blue jobs projects listed in this report. Keep in mind that some grant programs that have closed may be available again in the future.

- U.S. Department of Agriculture
    - Forest Service – Community Wildfire Defense Grant Program
- U.S. Department of Commerce
- U.S. Department of Defense
- U.S. Department of Education
- U.S. Department of Energy
- U.S. Department of Health and Human Services
    - Office of Community Services – Low-Income Home Energy Assistance Program (LIHEAP)
- U.S. Department of Housing and Urban Development
    - Green and Resilient Retrofit Program – Elements Cohort
    - Green and Resilient Retrofit Program – Leading Edge Cohort
    - Green and Resilient Retrofit Program – Comprehensive Cohort
    - California Department of Housing and Community Development - National Housing Trust Fund Program
- U.S. Department of Interior
    - Bureau of Ocean Energy Management – Renewable Energy Program
- U.S. Department of Justice
- U.S. Department of Labor
- U.S. Department of State
- U.S. Department of the Treasury
- U.S. Department of Transportation
    - Maritime Administration (MARAD) – Port Infrastructure Development Program (PIDP) grants
    - Federal Transportation Administration 5310 Grant Program
    - Neighborhood Access and Equity Grant Program
    - Federal Highway Administration
        - Promoting Operations for Transformative, Efficient, and Cost-Saving Transportation Program (PROTECT)
    - Multimodal Project Discretionary Grant Program
    - Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program

- U.S. Department of Veterans Affairs
- U.S. Economic Development Administration
- U.S. Environmental Protection Agency
    - Brownfields program
    - Clean Heavy Duty Vehicles program
    - Clean Ports Program
    - Clean School Bus Grant Program
    - Diesel Emissions Reductions Act
    - Environmental and Climate Justice Program grants
    - San Francisco Bay Water Quality Improvement Fund
    - Solid Waste Infrastructure for Recycling Grant Program
- U.S. Federal Emergency Management Agency
- U.S. Fish and Wildlife Service
- U.S. National Endowment for the Arts
- U.S. National Endowment for the Humanities
- U.S. Fish and Wildlife Foundation
- U.S. National League of Cities
- U.S. National Science Foundation
- U.S. Small Business Administration

State grants

The California Grant Portal (grants.ca.gov) provides information about grants and loans available from California state agencies. The website is searchable by keyword, grant-making agency, eligible applicant, and category.

One state government funding source that provides investments for many different green jobs projects is the California Climate Investments. Funding comes from the state's portion of the Cap-and-Trade auction and goes to the Greenhouse Gas Reduction Fund (GGRF). Thirty-five percent of these investments are made in disadvantaged and low-income communities.

The following list includes state agencies and grant programs that may be applicable to Richmond.

- California Air Resources Board
    - Carl Moyer Memorial Air Quality Standards Attainment Program
    - Clean Mobility Voucher Pilot Program
    - Low Carbon Transportation Investments and Air Quality Improvement Program

- California Coastal Commission
    - Local Coastal Program (LCP) Local Assistance Grant Program
    - Whale Tail Grants – Tolowa Dunes Stewards program promotes education through shoreline restoration
- California Coastal Conservancy
    - Explore the Coast Grants Program
- California Department of Community Services & Development Programs administers for the federal government:
    - Low-Income Home Energy Assistance Program (LIHEAP)
    - Low-Income Weatherization Program (LIWP)
    - Community Services Block Grant (CSBG) – provides funding to local non-profit and public agencies to help alleviate the causes and conditions of poverty
- California Department of Housing and Community Development
    - The Affordable Housing and Sustainable Communities (AHSC) program is designed to distribute Greenhouse Gas Reduction Funds to disadvantaged communities. Eligible projects for AHSC funding include those providing affordable housing, transit-oriented development (TOD), transit, complete streets, and active transportation projects that reduce greenhouse gas emissions (GHGs) and vehicle miles travelled (VMT).
- California Economic Development Department – offers funding for pre-development work through the Community Economic Resilience Fund (CERF) Catalyst Program (now known as California Jobs First). Each of California's 13 economic regions qualifies for up to $26.5 million to support the early development of projects that could become eligible for future California Jobs First implementation funding.
- California Energy Commission – offers grants and incentives for energy efficiency and electrification
    - Electric Program Investment Charge (EPIC) – grant funding for larger projects such as the $5 million solar emergency microgrid for Kaiser hospital in Richmond
    - Building Initiative for Low-Emissions Development Program
    - California Clean Energy Jobs Act K-12 Program (Proposition 39 School Retrofit Program) provided $550 million annually to K-12 schools and community colleges for energy efficiency retrofits and solar photovoltaic installation

        - Clean Transportation Program – $100 million annually for projects that align with California's goals for climate change, air quality, petroleum reduction, and adoption of zero-emission vehicles
        - Electric Vehicle Readiness Blueprint – to identify the best locations for charging infrastructure, help cities adopt development standards and ordinances that encourage EV adoption, and prepare the workforce of the future to maintain EVs and the charging infrastructure
- California Governor's Office of Business and Economic Development
- California Housing Finance Agency
- California Infrastructure and Economic Development Bank (iBank)
    - Infrastructure State Revolving Fund Program
    - Bond Financing Program
    - Expanding Venture Capital Access Program
    - Climate Catalyst Program
- California Labor and Workforce Development Agency
- California Natural Resources Agency
- California Ocean Protection Council
- California Pollution Control Financing Authority
    - Tax-Exempt Bond Financing Program/Green Bonds
- California Public Utilities Commission – offers grants for energy efficiency and electrification, often in partnership with utilities
    - Marin Clean Energy (MCE) received $158 million from the California Public Utility Commission (CPUC) to help fund low- and no-cost electric upgrades for low- and middle-income households
    - TECH Clean California – to accelerate the adoption of clean space heating and clean water heating technology
    - Energy Savings Assistance Program – provides no-cost weatherization services to low-income households
- California State Treasurer's Office
    - California Alternative Energy and Advanced Transportation Financing Authority
        - California Hub for Energy Efficiency Financing (CHEEF) Pilot Programs
        - Working Group on Energy Efficiency Financing Programs
        - Property Assessed Clean Energy (PACE) Loss Reserve Program
        - Sales Tax Exclusion (STE) for Manufacturers
        - Clean Energy Bond Financing

        - Qualified Energy Conservation Bonds
        - Private Activity Bonds for District Heating and Cooling
- California Transportation Commission
- California Water Boards
- California Wildlife Conservation Board
- CalRecycle
    - Greenhouse Gas Reduction Loan Program
    - Beverage Container Recycling Redemption Pilot Program
    - Recycling Market Development Zone (RMDZ) Revolving Loan Program
    - Organics Grant Program
    - Recycled Fiber, Plastic, and Glass Grant Program
    - Reuse Grant Program
    - Tire Incentive Program
- Caltrans
    - Active Transportation Program
    - Transportation Development Act
    - Sustainable Transportation Planning Grants
- Department of Toxic Substances Control
- Strategic Growth Council

Regional grants

- Bay Area Air Quality Management District
- Contra Costa Transportation Authority – $2.5 billion from Measure J sales tax revenue through 2034
- Metropolitan Transportation Commission
    - Active Transportation Program
    - Bipartisan Infrastructure Law Competitive Grants
    - Federal Transportation Administration Grants
    - Housing Incentive Pool Grants
    - Innovative Deployments to Enhance Arterials
    - Innovative Deployments to Enhance Arterials Shared Automated Vehicles (IDEA SAV)
    - Lifeline Transportation Program
    - Local Parking Management Grant Program
    - Priority Conservation Area Grants
    - Priority Development Area Grants
    - Transit Core Capacity Challenge Grants

Corporate grants

- Chevron Environmental and Community Investment Agreement (ECIA) Community Grant Program[36] – the ECIA includes investments in community programs, a scholarship program, competitive community grants, community-based greenhouse gas reduction programs, and a photovoltaic solar farm
- Closed Loop Infrastructure Fund – Closed Loop Partners is a New York-based investment firm comprised of venture capital, growth equity, private equity, and project finance, as well as an innovation center focused on building the circular economy. This fund provides zero-interest loans to municipalities and below-market-rate loans to private companies to improve recycling infrastructure across four primary categories: collection, sorting, processing or reclamation, and end-product manufacturing.
- Walmart Foundation – Local community grants are awarded through an open application process and provide funding directly from Walmart and Sam's Club facilities to local organizations in the U.S. There are eight areas of funding: community and economic development; diversity and inclusion; education; environmental sustainability; health and human service; hunger relief and healthy eating; public safety; and quality of life.

Philanthropic grants

- Bezos Earth Fund
- Bloomberg Philanthropies
- Climate Foundation
- Emerson Collective
- James Irvine Foundation
- Lever for Change
- Miranda Lux Foundation
- Richmond Connects
- The California Endowment
- Walton Family Foundation
- Waverley Street Foundation

Other grants

- ReFed – Catalytic Grant Fund – for reducing food waste

Bonds

- 501(c)(3) bonds – tax-exempt bonds used to fund charitable organizations (IRS)
- Public agency revenue bonds - bond financings for various State entities' economic or public development projects and programs (California Infrastructure and Economic Development Bank [iBank])
- Social impact bonds - A contract with the public sector or governing authority, whereby it pays for better social outcomes in certain areas and passes on part of the savings achieved to investors

Rebates

- California Public Utilities Commission – Self-Generation Incentive Program (SGIP) provides rebates to support existing, new, and emerging distributed energy resources on the customer side of the utility meter.
- Marin Clean Energy (MCE) – energy efficiency
- Association of Bay Area Governments
    - BayREN – energy efficiency

Funding for training

- California Workforce Development Board – High Road Training Partnership
- Investor-owned utilities such as Pacific Gas & Electric have workforce education and training funding

Tax credits and exemptions

- Work opportunity tax credit – for businesses that hire previously incarcerated individuals no later than one year after conviction or release from prison
- Governor's Office of Business and Economic Development (GoBiz) – offers incentives, grants, and financing

Bonding

- Federal – fidelity bonding for the first six months of employment for hard-to-place candidates; provides up to $5,000 of protection against losses

For Projects Offering Returns on Investment

The following financial tools may be available for businesses or public agencies that need investment funding for capital or operating expenses.

Bonds

Bonds are a fixed-income instrument that represents a loan made by an investor to a borrower, typically corporate or governmental. Examples include:

- Green bonds – A fixed income debt instrument in which an issuer (typically a corporation, government, or financial institution) borrows a large sum of money from investors for use in sustainability-focused projects (DOE)
- Industrial development bonds - Tax-exempt financing up to $10 million for qualified manufacturing and processing companies for the construction or acquisition of facilities and equipment (IBank)
- Exempt facility – Privately-owned projects that are financed with tax-exempt "private activity" bonds using state and local government entities as the conduit issuers of such bonds. Exempt facilities include airport facilities, solid waste disposal facilities, sewage facilities, etc.

Loans

- CalRecycle - Recycling Market Development Zone (RMDZ) low-interest loans
- Department of Toxic Substances Control (DTSC) - Brownfields Revolving Loan Fund Grant Program
- Other revolving loan funds
- Commercial bank loans
- Loan guarantees

Financing

- Project finance
- Venture capital

Number of Jobs Created

Investment funding available determines the number of jobs that will be created. A common metric is jobs created per million dollars invested. California Climate Investments (CCI) from the state's Greenhouse Gas Reduction Fund are granted

by the State. Appendix I details dozens of different projects funded by CCI and the number of jobs created per million dollars invested.

For the number of jobs that will be created by different projects through the Richmond Green-Blue New Deal and the number of capacity building staff needed to catalyze these jobs, see Figure 29.

Figure 29: RGBND Projects Organized by Potential Number of Jobs Created

Project	Description	Project Size	Number of Jobs	Capacity building staff (FTE)*
Port upgrades including electrification	Clean up pollution, rebuild wharfs to handle heavier loads, electrify	Large	100–1,000	0.5
Offshore wind turbine manufacturing	Build parts for offshore wind development projects in California and elsewhere	Large	100–1,000	0.5
Boat building	Manufacture boats which could range from smaller electric tugboats to larger 500' offshore wind turbine installation vessels	Large	100–1,000	0.2
Battery manufacturing	Attract more battery manufacturers to Richmond	Large	100–1,000	0.2
Green hydrogen	Manufacture hydrogen for difficult to decarbonize industries; if safety concerns and renewable energy sources addressed and if the community approves	Large	100–1,000	0
Solar emergency microgrids	Develop requests for proposals; design, permit, and install microgrids	Medium	10–100	0.2
Building electrification retrofits	Retrofit older homes (pre-1940 then pre-1978) for insulation, electric water heating and electric HVAC (heat pumps)	Medium	10–100	0.5
Green accessory dwelling units and tiny homes	Build factory to host workforce development training and build housing units in Richmond	Medium	10–100	0.1
Destination downtown	Invest in streetscape of a commercial area, support cohort of entrepreneurs for new restaurants, cafes, shared micro-manufacturing and micro-retail	Medium	10–100	0.1
Transition to zero-emission vehicles	Install and maintain electric vehicle charging infrastructure; maintain electric vans, fleet vehicles, buses, commercial trucks, and big rigs	Medium	10-100	0.2

**FTE = full-time equivalent*

Building deconstruction firms	Dismantle old buildings and sort salvaged materials by type for donation or sale	Medium	10–100	0.1
Building salvage warehouse	Accept donated materials such as wooden doors, windows, furniture, kitchen cabinets, art and hardware then sell them to keep valuable materials out of the landfill	Medium	10–100	0.1
Expanding the tree canopy	Grow seedlings into trees; urban planting	Medium	10-100	0
Living levee	Construct levee and plant native plants to manage storm surge waters	Medium	10–100	0.1
Brownfields research & innovation hub	Conduct research on soil cleanup technologies and showcase relative effectiveness of each	Medium	10–100	0.2
Community land trust	Develop contracts for shared ownership to build wealth in the community	Small	1-10	0
Transportation management association	Provide information and incentives to encourage residents and workers to commute by mass transit and active mobility modes	Small	1-10	0.1
Richmond remakery and fixery	Combine tool lending library, maker space, workshop, fixit clinic, after school enrichment classes, and summer camps	Small	1-10	0.25
Re-entry entrepreneurs	Offer members of the re-entry population business plan and woodworking classes to encourage starting businesses such as building furniture from salvaged materials	Small	1-10	0.25
Surplus food rescue	Pick up surplus food from events, caterers, grocery stores, and other large generators then deliver to non-profits serving people experiencing food insecurity	Small	1-10	0.1
Blue tech incubator and accelerator	Help aspiring entrepreneurs incubate and accelerate their blue tech ideas	Small	1-10	0.2
Berthing vessels at the port	Host large vessels at the port for a fee	Small	1-10	0
Training center for boat maintenance and repair	Train the next generation of boat mechanics	Small	1-10	0
Shoreline ecotourism	Offer the public opportunities for recreation, education, and tours of local plants and animals	Small	1-10	0.1

The total number of green-blue jobs unlocked for Richmond will be a function of which projects the community decides to pursue and funding available.

Next Steps for the Richmond Green-Blue New Deal

This report provides recommendations for projects that, when implemented, will create green-blue jobs. After choosing which projects the City of Richmond and the community are interested in pursuing, the necessary level of effort to move projects to the starting line is not insignificant.

Capacity Building

Initiating implementation requires project managers: people to identify funding sources for capital and operating expenses and to write grant proposals or business plans. City staff do not need to do all the heavy lifting to start these projects, though. Residents, staff at businesses, local community-based organizations, and Economic Development Commissioners have expressed interest in championing various green-blue projects once initial and ongoing funding options have been confirmed.

However, it would be helpful to have the equivalent of four additional full-time-equivalent personnel for a few years to line up the six elements for each chosen project to help get these projects off the ground: scope, demand, champion, workers, training, and funding.

A few options to add to the City of Richmond's capacity to prepare green jobs projects include:

- Applying to foundations for capacity-building funding to hire more staff
- Hiring Environmental Defense Fund Climate Fellows
- Hiring FUSE Fellows
- Hiring CivicSpark Fellows
- Finding consultants specializing in various topics

Details about tasks for project implementation can be found in the RGBND Implementation Plan.

Conclusion

In February 2019, Representative Alexandria Ocasio-Cortez introduced the U.S. House of Representatives Resolution 109: "Recognizing the duty of the Federal Government to create a Green New Deal."[37] The resolution was described as a historic opportunity to reduce greenhouse gas emissions in order to avoid the worst consequences of climate change while also working to fix societal problems like economic inequality and racial injustice. It inspired Green New Deals around the country, including the City of Richmond's Green-Blue New Deal Resolution, with the City Council adding "Blue" as a nod to Richmond's 32 miles of shoreline, the potential for work to restore waterways, and technological innovation in water-based industries.

In the years since the federal GND resolution, many cities have learned from each other and formulated increasingly specific green jobs plans. Federal, state, and regional government agencies, as well as philanthropies and the private financial sector, are standing by, ready to help. They're just waiting for more detailed plans about projects they can invest in. Capacity building to tee up these projects is key to tapping these opportunities so that Richmond's businesses, community-based organizations, and residents can capitalize on these opportunities.

Endnotes

1 According to the California Public Utilities Commission, the term "disadvantaged communities" refers to the areas throughout California that most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, and hazardous waste, as well as a high incidence rate of asthma and heart disease.

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Appendices

Appendix I:
Jobs per $1 Million Invested

California Climate Investments is a program administered by the California Air Resources Board (CARB). It is funded solely by Cap-and-Trade proceeds and aims to reduce greenhouse gas emissions, strengthen the economy, and improve public health and the environment, particularly in disadvantaged communities.

Figure 30: California Climate Investment Expenditures - Building Electrification and Energy Efficiency Projects

Greenhouse Gas Reduction Fund (GGRF) program	CCI investments ($ millions)	Total CCI + co-investment ($ millions)	Jobs per million (direct FTE's)	Direct FTE's from CCI + co-investment	% construction	% manufacturing	% professional services	Other
GGRF Energy Sector								
Single-family/small multi-family energy efficiency + solar water heating	49	49	10.896	534	34%	0%	0%	66%
Single-family solar photovoltaics	72	72	4.583	330	38%	10%	53%	0%
Large multi-family energy efficiency + renewables	24	29	4.664	133	54%	5%	49%	0%

Figure 31: California Climate Investment Expenditures - Sustainable Transportation Projects

Greenhouse Gas Reduction Fund (GGRF) program	CCI investments ($ millions)	Total CCI + co-investment ($ millions)	Jobs per million (direct FTE's)	Direct FTE's from CCI + co-investment	% construction	% manufacturing	% professional services	Other
GGRF Transportation Sector								
High speed rail	707	6,307	4.528	28,559	72%	0%	28%	0%
Transit and inner city rail	208	209	2.483	519	73%	19%	8%	N/A
Low-carbon transit operations	116	116	8.336	967	8%	3%	0%	90%

Affordable housing + sustainable communities	411	411	4.815	1,979	97%	0%	2%	2%
Clean vehicle rebates	204	679	1.701	1,154	0%	26%	5%	69%
Hybrid and zero-emission truck + bus vouchers	20	81	0.346	28	0%	67%	33%	0%
Enhanced fleet modernization	12	43	1.628	70	0%	7%	N/A	93%
Car sharing and mobility options	3	10	4.200	42	0%	11%	26%	63%
Public fleet pilot	3	13	2.154	28	0%	25%	3%	72%
Financing assistance pilot	1	2	14.500	29	0%	0%	95%	5%
Zero-emission truck + bus pilot	25	46	2.913	134	13%	17%	4%	67%
Multi-source facility demonstration	25	47	3.255	153	11%	24%	17%	48%
Zero-emission drayage truck demonstration	25	41	0.634	26	22%	33%	19%	26%

Figure 32: California Climate Investment Expenditures - Zero Waste Projects

Greenhouse Gas Reduction Fund (GGRF) program	CCI investments ($ millions)	Total CCI + co-investment ($ millions)	Jobs per million (direct FTE's)	Direct FTE's from CCI + co-investment	% construction	% manufacturing	% professional services	Other
GGRF Waste Sector								
The Greenhouse Gas Reduction Loan Program	9	70	1.133	79	33%	68%	0%	0%
Recycled Fiber, Plastic, and Glass Grant Program	5	19	1.230	23	20%	43%	27%	14%
Organics Grant Program	15	45	3.744	170	86%	7%	7%	1%

Figure 33: California Climate Investment Expenditures - Green Infrastructure and Urban Forestry Projects

Greenhouse Gas Reduction Fund (GGRF) program	CCI investments ($ millions)	Total CCI + co-investment ($ millions)	Jobs per million (direct FTE's)	Direct FTE's from CCI + co-investment	% construction	% manufacturing	% professional services	Other
GGRF Natural and Working Lands Sector								
Dairy Digester Research and Development Program	11	37	2.810	105	55%	9%	20%	15%
Urban and Community Forestry Program	16	16	9.268	146	5%	0%	50%	44%
Forest Legacy Program	4	19	0.036	1	N/A	N/A	N/A	N/A
Sacramento-San Joaquin Delta and Coastal Wetlands Restoration	15	15	6.377	98	64%	0%	16%	20%
Mountain Meadow Ecosystems Restoration	6	6	6.153	36	24%	0%	58%	17%
Forest Health Program	18	18	13.434	245	0%	0%	0%	100%

Figure 34: California Climate Investment Expenditures - Water Projects

Greenhouse Gas Reduction Fund (GGRF) program	CCI investments ($ millions)	Total CCI + co-investment ($ millions)	Jobs per million (direct FTE's)	Direct FTE's from CCI + co-investment	% construction	% manufacturing	% professional services	Other
GGRF Water Sector								
State Water Efficiency and Enhancement Program	56	56	2.165	120	57%	43%	0%	0%
Water-Energy Grant Program	47	47	6.850	321	15%	0%	37%	43%
State Water Project Turbines	20	26	2.538	66	N/A	N/A	N/A	N/A

Source: UCLA Luskin Center for Innovation[38]

Appendix II:
Eight Municipal Green New Deals

Richmond may be interested in reaching out to other cities that have crafted Green New Deals to see how they could help each other successfully implement their green jobs plans. The following eight GNDs are all different but ambitious.

- Los Angeles Green New Deal Sustainable City pLAn
- OneNYC 2050
- Boston Green New Deal and Just Recovery
- Green New Deal, Seattle, Washington
- Austin Climate Equity Plan, Austin, Texas
- Green New Deal, Ithaca, New York
- Green New Deal, Portland, Maine
- Portland Clean Energy Fund, Portland, Oregon

Los Angeles Green New Deal Sustainable City pLAn
Los Angeles, California

The Mayor released the first Sustainable City pLAn in 2015, committing to annual progress reports and a major update to the plan every four years. L.A.'s 2019 Green New Deal is an expanded vision of their pLAn, securing clean air and water and a stable climate, improving community resilience, expanding access to healthy food and open space, and promoting justice for all and for the future. L.A.'s Green New Deal will guide the city's transition to an equitable and abundant economy powered by 100% renewable energy.

This plan will support the creation of hundreds of thousands of good green jobs in all L.A. communities by:

1. Supplying 55% renewable energy by 2025, 80% by 2036, and 100% by 2045
2. Sourcing 70% of water locally by 2035 and capturing 150,000 acre ft/yr of stormwater by 2035
3. Reducing energy use per sq ft for all types of buildings with 22% by 2025, 34% by 2035, and 44% by 2050
4. Reducing vehicle miles travelled (VMT) per capita by at least 13% by 2025, 39% by 2035, and 45% by 2050

5. Ensuring 57% of new housing units are built within 1,500 ft of transit by 2025 and 75% by 2035
6. Increasing the percentage of zero-emission vehicles in the city to 25% by 2025, 80% by 2035, and 100% by 2050
7. Creating 300,000 green jobs by 2035 and 400,000 by 2050
8. Converting all city fleet vehicles to zero emission where technically feasible by 2028
9. Reducing municipal GHG emissions by 55% by 2025 and 65% by 2035 (from 2008 baseline levels), achieving carbon neutrality by 2045

A 2023 progress review by the City's Controller critiqued the lack of measurable progress on the plan's 47 long-term sustainability targets and 97 short-term milestones. The Controller recommended bolder targets for renewable energy, housing, the reduction of fossil-fuel powered cars, and alignment of the most urgent priorities with Inflation Reduction Act funding opportunities.

OneNYC 2050: Building a Strong and Fair City
New York City, New York

In 2019, Mayor de Blasio announced New York City's Green New Deal, which comprises $14 billion in new and committed investments, legislation, and concrete action at the city level to ensure a nearly 30% additional reduction in emissions by 2030. New York views a Green New Deal as a bold vision that meets the twin challenges of climate change and inequality.

In OneNYC 2050, New York hopes to demonstrate a model for inclusive growth and climate action with a focus on:

- Creating good-paying jobs, including green jobs, and promoting prosperity and economic security for all
- Ensuring equitable access to nature, clean air, and water
- Climate and community resiliency
- Healthy food
- Guaranteeing the right to quality healthcare and education in all communities
- Promoting justice by recognizing (and repairing the damage caused by) historic oppression of communities of color, migrant communities, youth, and other frontline and marginalized communities

OneNYC consists of eight goals and 30 initiatives that comprise a strategy to

prepare New York City for the future. The eight goals are: a vibrant democracy, an inclusive economy, thriving neighborhoods, healthy lives, equity and excellence in education, a livable climate, efficient mobility, and modern infrastructure.

- Committing to carbon neutrality by 2050 and 100% clean electricity
- Requiring buildings to cut their emissions – require all large existing buildings of 25,000 sq ft or more (of which there are 50,000 citywide) to make efficiency upgrades that lower their energy usage and emissions or face steep penalties
- Banning new inefficient glass-walled buildings – will no longer allow all-glass facades in new construction unless they meet strict performance guidelines, making inefficient glass-heavy building designs a thing of the past
- Hydro-powered City government – 100% carbon-free electricity supply for City government operations with the building of a new connection linking New York City to zero-emission Canadian hydropower
- Mandatory organics recycling – will make organics collection mandatory citywide, expanding the country's largest organics management program, including curbside pickup, drop-off sites, and support for community composting opportunities
- Reducing waste and carbon-intensive consumption – the City will end unnecessary purchases of single-use plastic foodware, phase out the purchase of processed meat, reduce the purchase of beef by 50%, and commit to a carbon-neutral City fleet by 2040
- Aligning with the U.N.'s Sustainable Development Goals

Boston Green New Deal
Boston, Massachusetts

In 2020, the then-City Councilor, Michelle Wu, released a plan outlining a Green New Deal and Just Recovery for the City of Boston to make Boston a transformed city. A local Green New Deal and Just Recovery must direct this scale of collective action to take aim at the root causes of systemic injustices. This report presents 15 examples to demonstrate the power of cities to lead:

1. Accelerating decarbonization as Boston commits to citywide carbon neutrality by 2040, 100% renewable electricity by 2030, and a net-zero municipal footprint by 2024
2. A justice audit and framework
3. Easing upfront costs of clean-energy infrastructure through green municipal bonds and the Property Assessed Clean Energy (PACE) program

4. Green workforce development
5. Divesting from harmful industries and reinvesting in a clean, just future
6. An urban climate corps
7. De-commodifying housing
8. Renters' right to counsel
9. Just and resilient development
10. Resilient stormwater infrastructure
11. Transportation justice
12. An equitable small business recovery
13. Food justice
14. Expansion of the urban tree canopy
15. A local blue new deal

Boston also has a Green New Deal coalition, a civic network of community organizations and issue advocates.

Green New Deal
Seattle, Washington

In 2020, the Seattle City Council voted to form the Green New Deal Oversight Board to advance the work of establishing a Green New Deal for Seattle. In 2022, Mayor Bruce Harrell signed into law $6,491,539 in Green New Deal Opportunity Fund investments, which will accelerate the City's efforts to reduce greenhouse gas emissions, build community resilience to climate change, and increase net-zero affordable housing. These investments are the first set to be recommended by the Oversight Board, which also suggested $2.6 million in rebates and incentives to help middle- and low-income residents to transition off oil to clean electric heat pumps.

Investments for the $6.5 million Green New Deal Opportunity Fund include:

1. $2.4 million to identify and develop resilience hubs in Seattle
2. $2.3 million to support efforts to get all City-owned buildings off fossil fuels by 2035 (the City of Seattle owns 650 buildings, including 27 public libraries, which are increasingly on the front lines of community care during climate emergencies)
3. $2 million to increase the number of city-funded affordable housing projects
4. $300,000 to support climate data and the Community Health Indicator project
5. $100,000 for community engagement to inform climate elements of the One Seattle Comprehensive Plan update

Austin Climate Equity Plan
Austin, Texas

In September 2021, the City Council adopted the Austin Climate Equity Plan. The plan includes the bold and aggressive goal of equitably reaching net-zero community-wide greenhouse gas emissions by 2040, with a strong emphasis on cutting emissions by 2030. Austin's Climate Equity Plan was created with input from nearly 200 community members, with an intentional focus on engaging racially and economically diverse residents about the challenges, barriers, and opportunities facing historically excluded groups.

Community Climate Ambassadors were mobilized to engage members of the Austin community on climate-related topics and provide feedback on potential strategies. Additionally, each strategy in the plan was evaluated through an equity tool that accounted for outcomes related to health, affordability, accessibility, community capacity, cultural preservation, accountability, and a just transition to green jobs. The plan comprises 17 goals and 74 strategies to achieve net-zero across five focus areas: Sustainable Buildings, Transportation and Land Use, Transportation Electrification, Food and Product Consumption, and Natural Systems.

Overarching strategies of the plan include green jobs and entrepreneurship; prioritization of local community initiatives; regional collaboration; and local carbon-reduction projects, carbon dioxide removal, and carbon offsets.

Green New Deal
Ithaca, New York

On June 5, 2019, the City of Ithaca Common Council unanimously adopted the Ithaca Green New Deal resolution, a government-led commitment to community-wide carbon neutrality by 2030 that focuses on addressing historical inequities, economic inequality, and social justice.

The Green New Deal goals include: 1) Community-wide carbon neutrality by 2030; 2) Ensuring that benefits are shared among all local communities to reduce historical social and economic inequities; 3) Meeting the electricity needs of government operations with 100% renewable electricity by 2025; and 4) 50% reduction of emissions from the city vehicle fleet by 2025.

Ithaca also has an ecovillage, a community of three neighborhoods that have been built over 20 years. Each cohousing unit has pioneered and continues to develop

new practices for green buildings and energy use. Ithaca also launched Electrify Ithaca, an initiative to replace all fossil fuel infrastructure with electric equivalents (such as heat pumps, induction cooktops, and air sealing) to ensure conditioned air is kept indoors. The City has partnered with expert BlocPower to provide competitive financing for residential and commercial electrification.

Green New Deal
Portland, Maine

Portland's Green New Deal requires any project receiving more than $50,000 in public subsidy to include solar or green roofs and to match other energy efficiency standards, and it requires developers of those projects to meet certain pay standards and employ apprentices on each job.

It also increases inclusionary housing standards so that 25% of units in new projects will be affordable to people earning up to 80% of the area median income, which in Portland is just over $100,000 a year for a family of four. The fee for opting out of including those units on site will be raised from $100,000 to $150,000.

The law also requires that the City produce an annual report surveying the reduced use of fossil fuels in building and construction. By tying together climate, housing, and labor goals, the measure is meant to show how the concept of a Green New Deal can be implemented at a local level.

In 2020, Maine also passed An Act to Establish a Green New Deal for Maine. The law will create a task force of labor, youth, climate science, and other representatives to craft a strategy for achieving 80% renewable energy in Maine by 2040, for creating good jobs in renewable energy and manufacturing, and to ensure low-income households have access to affordable solar power.

Portland Clean Energy Fund
Portland, Oregon

In 2018, Portland voters passed a ballot measure that created the Portland Clean Energy Fund (PCEF), which was officially adopted by the city council in 2019. The PCEF establishes a 1% business tax on companies that annually make over a billion dollars nationally and more than $500,000 locally. That money will be used for environmentally friendly job creation and sustainable building projects that will benefit low-income people and people of color.

Through this fund, small organizations can apply for mini-grants of up to $5,000 for projects that address racial, social, and climate-justice issues. The Portland Bureau of Planning and Sustainability released a full draft of the PCEF inaugural five-year Climate Investment Plan that outlines proposed funding allocations, strategies, and outcomes for program investments from 2023 through 2028.

Priority funding categories include: renewable energy and energy efficiency projects; transportation decarbonization projects; green infrastructure projects; regenerative agriculture projects; climate jobs training, apprenticeships, and contractor development projects; organizational capacity-building projects; and other projects that reduce or sequester greenhouse gases.

Appendix III:
K-12 Environmental Education and Green Careers Awareness

Preparation for Green Careers of the Future

In the World Economic Forum's Future of Jobs Report 2020, employers estimate that four in ten workers will need to be reskilled. To prepare today's students for the green jobs of the future, here are six key skills that will be helpful.

1. Science skills: Key roles include environmental scientists, biologists, hydrologists, and biochemists. People in these jobs will monitor, manage and protect natural resources including land and valuable water supplies.
2. Architectural and planning skills: Buildings will become more energy efficient, with fewer resources used to construct and operate them. Architects and planners will design these buildings to comply with environmental regulations and client demands for green spaces.
3. Green engineering and tech skills: Helping to design and maintain solar panels, wind turbines, low emission vehicles and other green economy technology.
4. Agriculture skills: As farming and food supply becomes more sustainable, there'll be a growing number of green jobs in areas such as organic farming, urban farming and precision agriculture. The use of information technology and other tech-based programs to make farming more accurate and controlled.
5. Environmental justice skills: Workers will gain legal, social and historical awareness to ensure humanity does not repeat the mistakes of the past which led to racial and social injustice and poor environmental and social health.
6. Systems skills: Workers will need to assess systems against performance indicators and find ways to optimize and improve system operations. They will need skills in macroeconomics to build sustainability into long-term infrastructure projects.

An important foundation for these skills is an understanding of the natural environment cultivated in elementary, middle, and high school. Below are links to six K-12 environmental education and environmental careers curricula.

California Department of Education

The Education and the Environment Initiative was adopted by the State Board of Education in 2010 with the goal to increase environmental literacy for California's kindergarten through grade twelve (K-12) students. The curriculum can serve as a useful resource for teaching academic content standards within an environmental context.

San Francisco Unified School District

The SFUSD is working towards district-wide implementation of the Next Generation Science Standards (NGSS) through a core curriculum. The curriculum engages students in taking on real-life tasks that use San Francisco as the classroom. Students are led to build mastery and personalize their learning in their approaches to the real-life tasks. Their website has a breakdown of NGSS standards by grade level.

Roots of Success

An empowering environmental literacy and job training program that prepares youth and adults who have been failed by the education system to access jobs and career pathways in environmental fields and improve environmental and social conditions in their communities.

Centered around a federally registered Department of Labor (DOL) Apprenticeship and Pre-Apprenticeship, Roots of Success is offered in high schools, youth programs, job training programs, reentry programs, prisons, jails, juvenile facilities, and other workforce and education settings throughout the United States. Since 2009, over 26,000 youth and adults have gone through the program; with 12,000 taking the course while incarcerated.

Washington Office of Superintendent of Public Instruction

The K-12 Integrated Environmental and Sustainability Learning Standards were developed in collaboration with educators from across Washington and describe what all students should know and be able to do in the area of Environmental and Sustainability Education. Their website has a spreadsheet with examples of what the curriculum would look like based on grade and makes connections to themes of climate change, environmental justice, etc.

National Environmental Education Foundation (NEEF)

NEEF partners with organizations to reach a national audience of students with environmental education activities that develop a deeper sense of environmental stewardship. The foundation has two approaches: 1) Greening STEM: A collaboration between schools, nonprofits, and public spaces to create an immersive outdoor learning experience that enriches STEM learning and creates a sense of place for students. This utilizes place-based learning to bring the classroom outside. 2) Climate Superstars education guide: standards-aligned lessons that teach students about climate change, energy efficiency, and sustainability.

North American Association for Environmental Education (NAAEE)

The organization created K-12 Environmental Education: Guidelines for Excellence that provides students, parents, caregivers, educators, and others a roadmap to achieving environmental literacy by setting expectations for fourth (age 10), eighth (age 14) and twelfth grade (age 18) students and outlining a framework for effective and comprehensive environmental education programs and curricula. The guidelines set a standard for high quality education, based on what an environmentally literate person should know and be able to do by the time they graduate from high school.

U.S. Environmental Protection Agency

The EPA has a list of lesson plans, teacher guides and online environmental resources for educators that is separated by the grade it applies to and the type of resource it is.

APRIL 2024

Gap Analysis

ENVIRONMENTAL POLICY GOALS AND CURRENT STATE

Submitted to the City Manager's Office
City of Richmond, California

Prepared by: **Apparaccel** and **Medema Consulting,**
as part of the Richmond Green-Blue New Deal
https://www.ci.richmond.ca.us/4138/Green-Blue-New-Deal-and-Just-Transition

Acknowledgements

City Council

Eduardo Martinez, Mayor
Claudia Jimenez, Vice Mayor
Soheila Bana
Gayle McLaughlin
Doria Robinson
Melvin Willis
Cesar Zepeda

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Community Partners

1Hundred Years
Asian Pacific Environmental Network
Blue Frontier
Boilermakers Union
Center for Creative Land Recycling
Chevron
CoBiz Richmond
Collaborising
Contra Costa Building Trades
Contra Costa Community College
Cooperation Richmond
Council of Industries
CSU Maritime
Construction Trades Workforce Initiative
East Bay Economic Development Alliance
Food Bank of Contra Costa and Solano County
Groundwork Richmond
International Brotherhood of Electrical Workers
Laborers' International Union
Marin Clean Energy
Othering & Belonging Institute, UC Berkeley
Pacific Environment
Plant to Plate
RCF Connects
Rebuilding Together East Bay Network
RecycleMore
Renaissance Entrepreneurship Center
Republic Services
Rich City Rides
Richmond LAND
Richmond Listening Project
Richmond Main St. Initiative
Richmond Neighborhood Housing Services
Rising Sun Center for Opportunity
Rubicon
RYSE
SF Made
Sims Metal
SMART Sheet Metal Workers union
The Watershed Project
Urban Ore
Urban Tilth
Water Emergency Transportation Authority
West County Wastewater
Working Waterfront

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Executive Summary

How do we know what types of green jobs will be created in the future? By studying environmental policy goals set at the federal, state, and local levels. Government agencies have developed ambitious goals for energy, buildings, transportation, consumer goods, and nature, all goals that are steering our society toward a more just, equitable, resilient, and sustainable future.

These policy goals build on the interconnected web of environmental protection regulations government agencies have created over the past half century to address pollution concerns. This Gap Analysis studies the more recent environmental policy framework that attempts to address the rising existential crises of climate change and mass species extinction.

At a high level, the environmental policies included in this analysis will move society closer to:

- An electricity grid powered by 100% renewable energy
- Buildings retrofitted to be all electric
- An expanded number of housing units
- Zero-emission vehicles and expanded active mobility options
- Zero waste with more waste prevention, reuse, recycling, and composting
- Rescue of surplus food to feed people
- Conservation of 30% of land and waterways to restore biodiversity
- Brownfield site cleanup to expand economic development opportunities

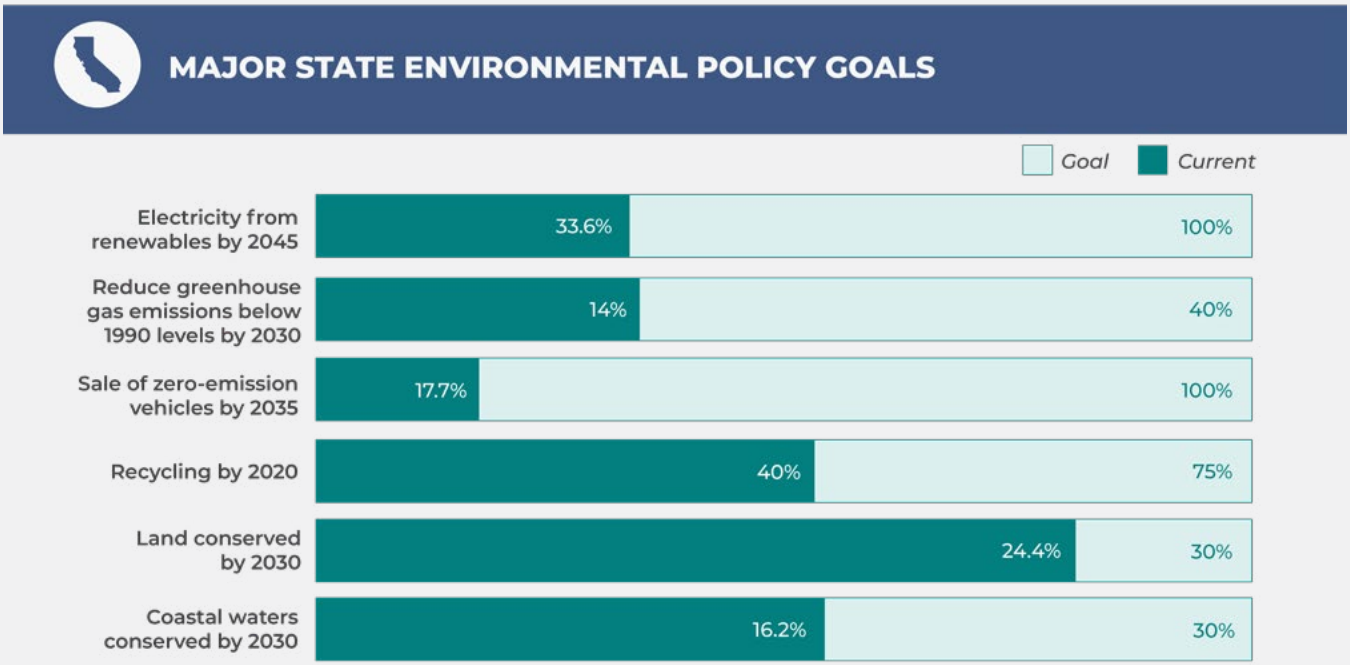
In this report, environmental policy goals are organized by topic, with progress toward these goals measured where data is available. The gaps between goals and the current state illuminate the opportunities for job creation in projects that will stabilize the climate and restore environmental health while also improving human health outcomes, providing family-sustaining wages, and building wealth among Richmond residents.

Introduction

The Richmond Green-Blue New Deal Gap Analysis starts by considering the framework of environmental policy goals set at the federal, state, and local levels for the years 2025–2050. Government agencies have invested time to study, develop, and request public feedback about these environmental policy goals.

Honoring the level of effort and thoughtfulness of the policy development process, this Gap Analysis looks at the gap between government environmental policy goals that have been set and where we are today. The difference between the two represents the work that needs to be done to close these gaps. In Figure 1, the light green bars on the right side of the graphic represent the green jobs that will be needed to reach these goals.

Figure 1: Gap Between California's Environmental Policy Goals and the Current State



This report contains seven chapters that cover the following policy topics:

1. Renewable Energy
2. Building Electrification and Energy Efficiency
3. Sustainable Transportation
4. Zero Waste
5. Green Infrastructure and Urban Forestry
6. Land Use
7. Water

Each chapter provides an overview of the topic, the environmental policy goals timeline, progress toward the policy goals, and green-blue jobs projects that will help meet the goals.

CHAPTER 1
Renewable Energy

Renewable energy is energy produced from sources like the sun and wind, which are naturally replenished and do not run out. In contrast, non-renewable energy comes from finite sources that could be used up, such as fossil fuels like natural gas, oil, and coal.

Eligible renewable energy resources that help the state meet its renewable energy goals include solar, wind, geothermal, biomass, small hydro, renewable methane, ocean wave or thermal, and fuel cells using renewable fuels.

1.1 Environmental Policies and Timeline

Altogether, federal, state, and local government agencies have contributed legislative bills, executive orders, agency goals, government pledges, plans, and local ordinances that shine a light on the path to a clean-energy future. These collective environmental policies for 2025 through 2050 guide public and private investment in renewable energy systems that will help society address climate change, improve local air quality, and advance public health outcomes.

The following renewable energy and greenhouse gas reduction goals are grouped through 2030, 2040, and 2050 and organized by federal, state, and local levels.

Figure 2: Policy Goals for Renewable Energy, by 2030

By 2030	
Federal	RE F1 – Directs the Department of the Interior to permit 25 gigawatts of renewable energy on departmentally managed lands by 2025 (Energy Act of 2020, Section 3104)[1]
	RE F2 – 10 million solar roofs by 2020 (Senate Bill 1108)[2]
	RE F3 – 30 gigawatts offshore wind energy by 2030 (Executive Order 14008)[3]
	RE F4 – 50–52% reduction below 2005 levels in economy-wide net greenhouse gas pollution by 2030 (U.S. Pledge to Paris Agreement on Climate Change)[4]
State	RE S1 – 50% of California's electricity to be powered by renewable sources by 2025 (Senate Bill 100)[5]
	RE S2 – 60% of California's electricity to be powered by renewable sources by 2030 (Senate Bill 100)[6]
	RE S3 – One million solar roofs by 2018 (Senate Bill 1)[7]
	RE S4 – 300 megawatts of rooftop solar on multi-family affordable housing by 2030 (Assembly Bill 693)[8]
	RE S5 – 2–5 gigawatts of offshore wind by 2030 (Assembly Bill 525)[9]
	RE S6 – 40% reduction of greenhouse gases below 1990 levels by 2030 (Senate Bill 32 and Assembly Bill 32)[10]
Local	RE L1 – A complete conversion to a 100% renewable energy system for both electricity and transport by 2030 (City of Richmond Resolution No. 88-21)[11]
	RE L2 – MCE's Light Green portfolio will include a minimum of 85% renewable energy by 2029, while its Deep Green portfolio will continue to offer 100% renewable energy (Marin Clean Energy [MCE], Richmond's Community Choice Aggregator)[12]

Figure 3: Policy Goals for Renewable Energy, 2031–2040

2031-2040	
Federal	RE F5 – 100% of electricity will be carbon pollution-free by 2035 (White House target)[13]
State	RE S7 – 90% of all retail electricity sales will be supplied by renewable energy and zero-carbon resources by 2035 (Senate Bill 1020)[14]
	RE S8 – 95% of all retail electricity sales will be supplied by renewable energy and zero-carbon electricity by 2040 (Senate Bill 1020)[15]

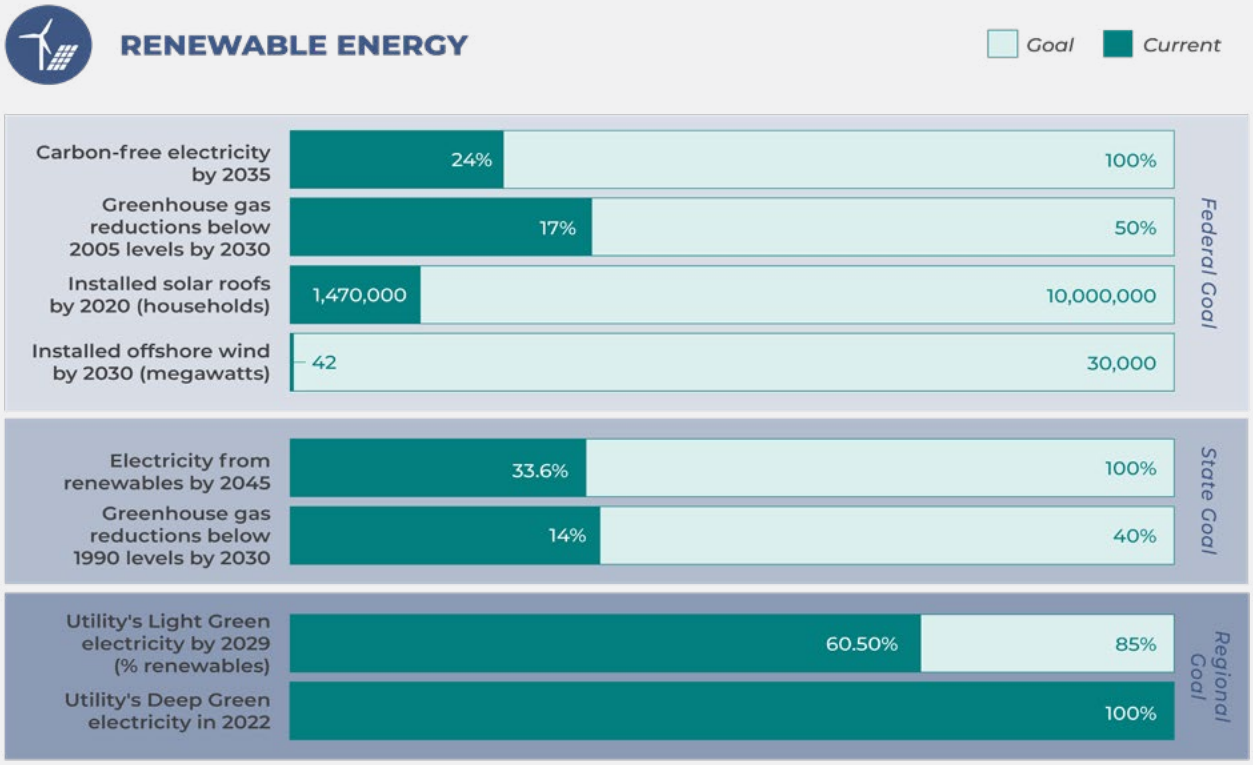
Figure 4: Policy Goals for Renewable Energy, 2041–2050

	2041-2050
Federal	RE F6 – 110 gigawatts of offshore wind development by 2050 (White House target)[16]
State	RE S9 – Renewable and zero-carbon energy resources supply 100% of electric retail sales to customers by 2045 (Senate Bill 100 and Senate Bill 1020)[17, 18]
	RE S10 – 25 gigawatts offshore wind capacity by 2045 (Assembly Bill 525)[19]
	RE S11 – 80% reduction of greenhouse gases below 1990 levels by 2050 (Executive Order S-3-05, Senate Bill 375, and Assembly Bill 32)[20, 21, 22]
	RE S12 – Carbon neutrality by 2045, with net negative greenhouse gas emissions thereafter (Executive Order B-55-15)[23]
Local	RE L3 – 80% reduction of greenhouse gases below 1990 levels by 2050 (Resolution 108-08)[24]

1.2 Progress Toward Policy Goals

With the above-listed policy goals in mind, the following shows progress to date using the most recent numbers available.

Figure 5: Gap Between Renewable Energy Goals and Current State



United States

- **Renewables overall:** In the first half of 2022, 24% of U.S. utility-scale electricity generation came from renewable energy, which includes conventional hydropower, wind, solar, and geothermal (U.S. Energy Information Agency)

  >> Percent complete: 24% (toward a goal of 100% carbon pollution-free electricity by 2035)

- **Installed residential solar:** In December 2018, Stanford University's DeepSolar program announced that it had mapped 1.47 million solar homes across the lower 48 states (Stanford University)

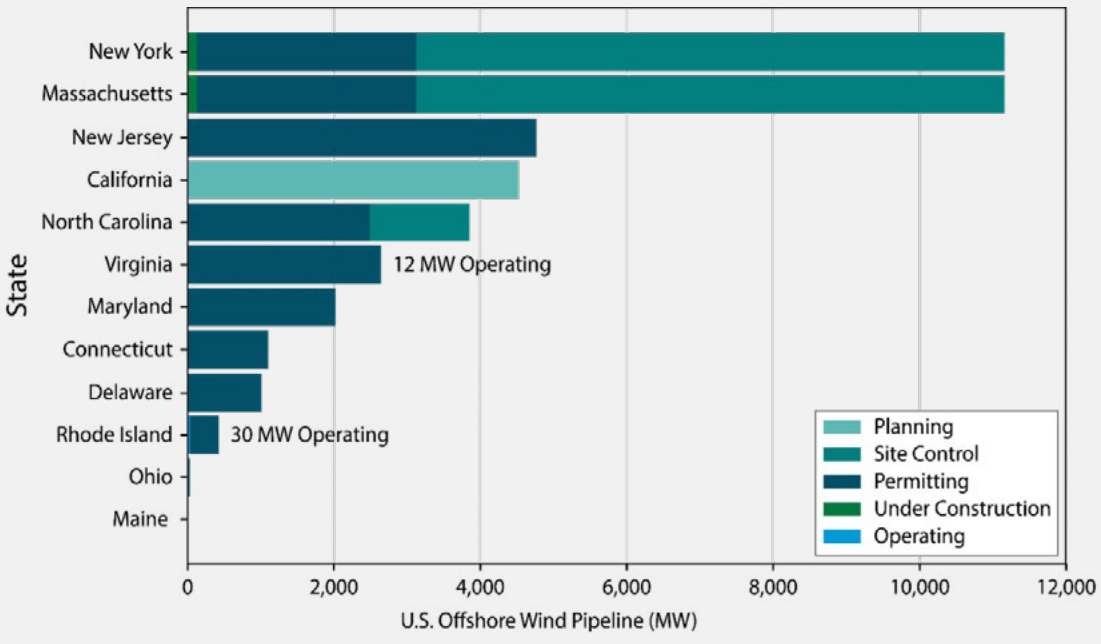
  >> Percent complete: 14.7% (1.47 million toward goal of 10 million solar roofs by 2020)

- **Installed offshore wind:** As of 2022, there were 42 megawatts of offshore wind in Rhode Island and Virginia (U.S. DOE)

  >> Percent complete: 0.14% (42 megawatts toward the goal of 30,000 megawatts by 2030)

- Over the next decade, gigawatts of offshore wind being developed along the East Coast, Gulf Coast, and West Coast will come online. Figure 6 notes the statuses of offshore wind projects being planned.

Figure 6: Offshore Wind Turbines Planned and Installed in the U.S.



Source: U.S. Department of Energy[25]

- **Reduction of greenhouse gases:** In 2021, U.S. greenhouse gas levels were 17% below 2005 levels after accounting for sequestration from the land sector (U.S. EPA)

  >> Percent complete: 17% toward a goal of 50–52% below 2005 levels by 2030

California

- **Eligible renewables:** In 2021, the eligible renewable energy mix was 33.6% of electricity (California Energy Commission)

  >> Percent complete: 33.6% (of 100% by 2045 goal)

- **Solar roofs:** California Senate Bill 1 set a goal of one million solar roofs by 2018

  >> Date realized: 2019

- **Greenhouse gas reductions:** As of 2020, California had reduced greenhouse gases 14% below 1990 levels (California Air Resources Board)

  >>Percent complete: 14% toward 40% below 1990 levels by 2030

Richmond

- **Renewable energy:** In 2021, the power content of MCE's Light Green electricity product was 60.5% renewables.

  >> Percent complete: 60.5% renewables in Light Green electricity toward goal of 85% by 2029

The City of Richmond and its many community partners have made progress expanding local renewable energy generation.

- 3,585 residential solar permits have been issued since 2012 (Transparent Richmond)
- GRID Alternatives provides free solar systems to income-qualifying homes in Richmond and North Richmond. They have installed solar systems on more than 470 low-income households in Richmond, saving more than $10 million in energy costs and preventing over 13,000 tons of greenhouse gas emissions.
- 10.5 megawatt Solar One solar farm in Richmond operated by MCE (Richmond Climate Action Plan Strategy RE 1 – increase local solar energy generation)

- MCE is a non-profit public agency that provides clean electricity to Richmond. MCE has been working continuously to boost the percentage of renewable energy in its Light Green electricity product. Currently, 80% of Richmond residents and businesses have enrolled in MCE's Light Green program, which supplies 50% of their electricity from renewable sources. (Richmond Climate Action Plan Strategy RE 2 – Promote and maximize utility clean energy offerings)
- MCE is planning the rollout of a Virtual Power Plant (VPP) in 2025, a project that will help commercial, municipal, and low-income residential customers flexibly manage assets such as energy storage, smart thermostats, solar photovoltaics, electric vehicle chargers, and load shifting, enabled by building energy management systems, HVAC controls, and other resources. The VPP project will advance state and local goals for energy and carbon savings while maximizing benefits to the local community, the grid, and low-income residents.
- MCE has incentive programs for businesses and multifamily dwellings to convert equipment from natural gas to electric (Climate Action Plan Strategy RE 3 – Promote conversion from natural gas to clean energy)
- ZNE Alliance is a non-profit working on the Richmond Advanced Energy Community Project to develop a comprehensive revitalization for Richmond, focused on 100% clean energy, the transformation of abandoned homes into new ZNE infill housing, and energy-efficient building retrofits.

The City of Richmond also included policies about developing local renewable energy sources and reducing greenhouse gas emissions in their General Plan 2030.

- Promote the generation, transmission, and use of a range of renewable energy sources such as solar, wind power, and waste energy to meet current and future demand and encourage new development and redevelopment projects to generate a portion of their energy needs through renewable sources. (General Plan 2030 – Policy EC 3.1 – Renewable Energy)
- Work toward reducing the overall energy footprint from residential, industrial, transportation, and City operations. Address energy use to meet state requirements for greenhouse gas emission reductions, as well as to protect the health and safety of residents and visitors. Involve residents, businesses, public agencies, and neighboring jurisdictions in addressing climate change by taking a leadership role in meeting these targets. (General Plan 2030 – Policy HW 10.1 – Citywide Energy Footprint)

1.3 Potential Green-Blue Jobs Projects

Building on the progress outlined above, the following projects related to renewable energy will build on Richmond's assets and strengths and move closer to federal, state, and local environmental policy goals.

- Solar emergency microgrids at critical community facilities – develop local expertise to design and install resilient energy systems that allow emergency electrical demands (e.g., lights, communications, refrigeration) to function when the grid is down at critical community facilities (such as fire stations, police stations, healthcare facilities, wastewater treatment plants, and public schools)
- Battery manufacturing – manufacturing of energy storage for vehicles, buildings, and mobile applications, such as at construction sites and movie sets
- Offshore wind turbine part manufacturing – to meet the demand for offshore wind development being planned by the State of California in support of the 5 gigawatts by 2030 and 25 gigawatts by 2045 goals
- Green hydrogen – energy for difficult-to-decarbonize applications, such as long-haul flights, long-distance trucking, steel manufacturing, and ammonia manufacturing for fertilizer[26]

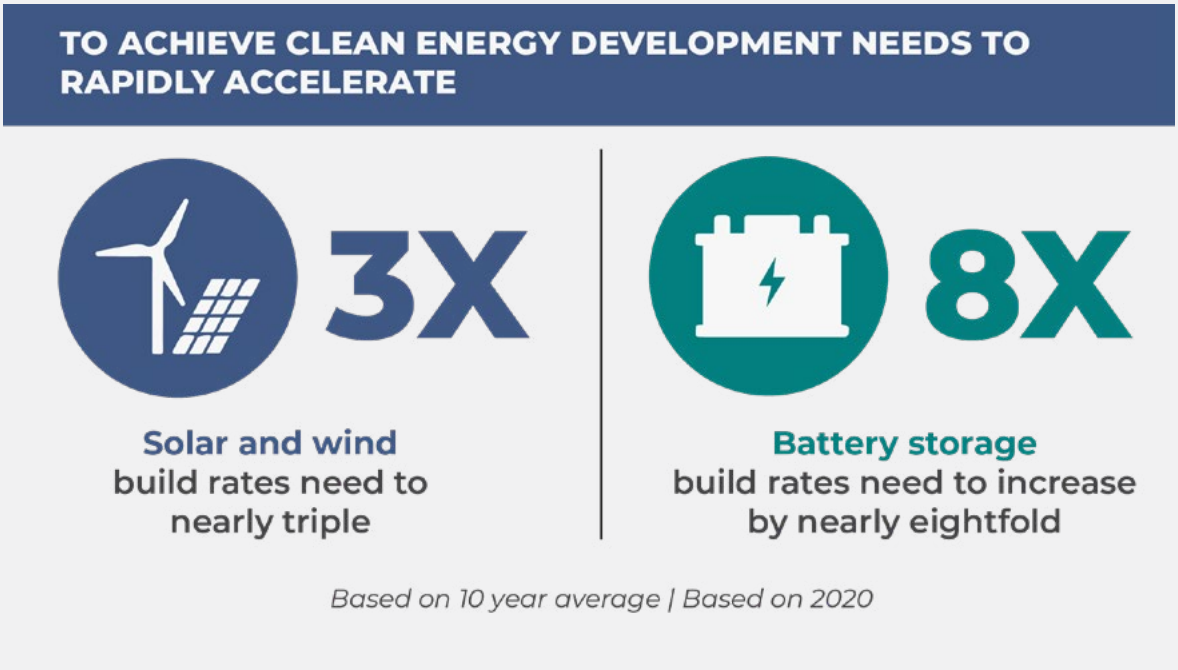
1.4 Conclusion

Closing the gap between governmental clean energy goals and our current status will require significant investments in new technologies with a sustained build-out of existing clean energy projects. To reach California's 100% by 2045 target while electrifying other sectors, the state will need to roughly triple its current electricity grid capacity.

The electricity grid will also require more energy storage capacity as California moves closer to its 100% clean energy goal. Solar and wind are intermittent power sources, and as renewables provide a larger percentage of the electricity power mix, energy storage will be necessary to align supply and demand. Figure 7 underscores the scale of buildout needed.

Every clean-energy project that goes online helps California shrink the amount of natural gas burned by utilities to generate electricity and helps reduce greenhouse gas emissions. The continued transition away from fossil fuel combustion will benefit Richmond residents by reducing air pollution, delivering public health benefits, and addressing environmental justice while growing the economy and bringing good-paying jobs to the city.

Figure 7: Development Needs to Accelerate Clean Energy



Source: California Energy Commission

Chapter 2
Building Electrification and Energy Efficiency

Richmond has 38,499 housing units and 13,351 commercial buildings. Many of these buildings burn natural gas onsite for space heating, water heating, cook stoves, clothes dryers, and other applications. Building decarbonization, which involves switching from natural gas to electric in these applications, will help the City of Richmond achieve the goal in Resolution #108-80 to reduce greenhouse gases (GHGs) 80% below 1990 levels by 2050.

Besides demonstrating local leadership in climate solutions, accelerating the switch from burning of natural gas indoors to electric equipment will help the City of Richmond realize its Health in All Policies strategy, which promotes health equity and well-being for all residents where they live, work, learn, and play. By enabling upgrades of equipment from natural gas to electric, government agencies and the utility will help ensure healthier indoor spaces for low-income and vulnerable populations.[27]

2.1 Environmental Policies and Timeline

The following timeline of existing state and local policies will guide future building electrification and energy efficiency upgrades.

Figure 8: Policy Goals for Building Electrification, by 2030

	By 2030
State	BE S1 – Starting in 2020, all new residential construction will be Zero Net Energy (California Public Utilities Commission, Decision 07-10-032)[28]
	BE S2 – Starting in 2030, all new commercial construction in California will be Zero Net Energy (CPUC, Decision 07-10-032)[29]
	BE S3 – By 2030, retrofit 50% of existing commercial buildings to Zero Net Energy (California Energy Efficiency Strategic Plan)[30]
	BE S4 – In Sept 2022, the California Air Resources Board adopted a zero-emission standard for new residential space- and water-heating appliances starting in 2030 (California Air Resources Board)[31]
	BE S5 – By 2030, deploy three million climate-ready homes and six million heat pumps in new buildings or major renovations. Fifty percent of funding to achieve these goals shall be directed toward disadvantaged communities. (July 22, 2022 letter from Governor Newsom to the California Air Resources Board)[32]
	BE S6 – California needs 2.5 million additional housing units by 2030 (Governor Newsom's announcement in 2022)[33]
Local	BE L1 – Beginning on Jan. 1, 2027, no person shall sell, install, or offer for sale within the District any natural-gas-fired storage tank water heater (Bay Area Air Quality Management District amendment to Regulation 9, Rule 6)[34]
	BE L2 – Beginning on Jan. 1, 2029, no person shall sell, install, or offer for sale within the District any natural gas-fired furnace. This includes non-central installations such as wall furnaces, as well as units installed in non-residential applications. (Bay Area Air Quality Management District amendment to Regulation 9, Rule 4)[35]
	BE L3 – Convert 1,328 residential water heaters annually from natural gas to electric in Richmond homes by 2030 (Richmond Climate Action Plan, Strategy RE 3)[36]
	BE L4 – Electrify 17% of commercial natural gas use by 2030 (Richmond Climate Action Plan, Strategy RE 3)[37]
	BE L5 – Starting in 2020, all newly constructed buildings shall be all-electric (City of Richmond Ordinance No. 06-20 N.S., amending the 2019 California Energy Code, California Code of Regulations, Title 24, Part 6)[38]
	BE L6 – As of Jan. 1, 2022, natural gas infrastructure is banned in newly constructed buildings (Richmond Municipal Code, Chapter 9.64.040)[39]
	BE L7 – By 2030, all new commercial buildings will be Zero Net Energy (Richmond's Climate Action Plan, Strategy EE 3)[40]

Figure 9: Policy Goals for Building Electrification, 2031–2040

	2031-2040
State	BE S6 – Deploy seven million climate-ready homes in new buildings or major renovations by 2035 (July 22, 2022 letter from Governor Newsom to the California Air Resources Board)[41]
Local	BE L8 – "Beginning in 2031, no person shall sell, install, or offer for sale within the District any large natural gas-fired boiler, storage tank water heater, or instantaneous water heater." (Bay Area Air Quality Management District amendment to Regulation 9, Rule 6)[42]
	BE L9 – Richmond's "fair share" of new housing is 3,614 new homes by 2031 (6th Regional Housing Needs Allocation)[43]

Figure 10: Policy Goals for Building Electrification, 2041–2050

	2041-2050
State	BE S7 – Commercial buildings will undergo a transition from gas appliances to electric appliances, achieving 80% sales of all-electric appliances by 2035 and 100% by 2045 (California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality)[44]
	BE S8 – California joined a commitment to ensure that all new buildings operate at net zero carbon emissions by 2030 and for all buildings to do so by 2050 (Net Zero Carbon Buildings Commitment, World Green Building Council for the Global Climate Action Summit)[45]
Local	BE L9 – Commits to the greenhouse gas emissions reduction target established by California Assembly Bill 32 and Executive Order S-3-05 and to achieving an 80% reduction below 1990 levels by 2050 (Richmond City Council Resolution No. 108-08)[46]

California

Foundational to the policies listed above, the State of California's Title 24 regulations guide energy efficiency improvements in buildings. The California Air Resources Board oversees cycles of tightening requirements on building energy efficiency: every three years they develop ever-stricter regulations, ask for public input, and then finalize new rules.

Bay Area

The Bay Area Air Quality Management District (BAAQMD) recently passed regulatory requirements that will ensure building electrification efforts continue. In March 2023, the BAAQMD Board voted nearly unanimously to:

- ban the sale or installation of natural gas water heaters in the Bay Area, starting in 2027
- ban the sale or installation of natural gas furnaces in the Bay Area, starting in 2029

As existing natural gas space heaters and water heaters fail over the next decade and contractors are only able to replace them with all-electric equipment, these bans will result in reduced greenhouse gases and improved indoor air quality in commercial and residential buildings throughout the Bay Area.

Richmond

Goals the City of Richmond set in its General Plan 2030, Climate Action Plan, Economic Development Action Plan, and Workforce Development Plan jointly indicate the path forward on building electrification, energy efficiency, and reduction of greenhouse gases.

- City of Richmond Climate Action Plan – In 2016, Richmond's City Council adopted the Climate Action Plan to help guide how the city could pursue GHG emission reductions and prepare for impacts of climate change. The sections most relevant to this analysis are:
    - Objective 1: Increase Energy Efficiency of Buildings and Facilities
        - Strategy EE 1 – Leverage existing programs and rebates to improve efficiency of existing buildings (improve the energy efficiency of all existing buildings by 50% by 2030)
    - Objective 2: Increase Use and Generation of Renewable Energy
        - Strategy RE 3 – Promote conversion from natural gas to clean electricity (by 2030, replace 1,328 natural gas water heaters in homes each year with electric models and electrify 17% of commercial natural gas use)
- City of Richmond General Plan 2030 – In 2012, Richmond's City Council adopted their General Plan, which is intended to guide investments and decision-making for the city through 2030.

        - Element 8 – Energy and Climate Change, which includes the following goals:
            - Goal EC1 – Leadership in Managing Climate Change
            - Goal EC3 – Sustainable and Efficient Energy Systems
            - Goal EC5 – Community Revitalization and Economic Development
- City of Richmond Health in all Policies – In 2014, Richmond's City Council passed an ordinance that requires/empowers the city to identify and, when possible, address individual and community health impacts of city policies, projects, and programs.
- City of Richmond Advanced Energy Community Report: This 2018 effort by several state and local organizations reviewed and compiled several financial, policy, and program models for zero net energy buildings in Richmond, with the goals of reducing GHG emissions and improving health.
- Richmond Advanced Energy Community is a collaboration between the City of Richmond, Richmond Community Foundation, MCE, and GRID Alternatives to upgrade 100 homes to lower pollution and the risk of power outages through small and automated energy-saving actions.
- Richmond BUILD Academy is a public-private partnership focused on developing talent and skill in the high-growth, high-wage construction and renewable energy fields. Participants complete the core Carpentry Pre-Apprenticeship track and then choose from electives such as extended carpentry, hazardous waste removal, solar energy, energy efficiency, and electrical wiring and theory.

The local objectives, strategies, elements, and goals listed above are being implemented through programs such as the Contra Costa County Weatherization Program for low-income residents, BayREN's energy efficiency programs for residences, small businesses, and municipalities, and utility MCE's building electrification and energy efficiency incentive programs for businesses and residences.

Other community-based organizations working on building decarbonization and energy efficiency include:

- Rising Sun Center for Opportunity, a non-profit organization that focuses on building healthy communities through climate solutions and green career pathways. They provide youth and low-income adults with meaningful training and employment opportunities in the growing green energy

economy while delivering free energy and water conservation upgrades to thousands of households each year. The organization has served over 3,000 youths and adults and made 57,522 homes more climate resilient and efficient. They have also convened 22 partners as members of a High Road Training Partnership.

- Richmond Community Foundation, Richmond Neighborhood Housing Services, SparkPoint Contra Costa, and Mechanics Bank work together on the Richmond Housing Renovation Program. Funded by social impact bonds, this program upgrades blighted houses to all-electric, zero net energy buildings and allows first-time local home buyers to purchase these homes.
- The Rebuilding Together East Bay Network's Tiny Village Spirit project trains unsheltered and other underserved and socially marginalized young people, ages 16–24, in community organizing to create justice. Guided by coordinator Sally Hindman, the young people from Tiny Village Spirit are leading the project by carrying out the necessary steps and activities to create a Tiny House Village, farm, and garden in their community.

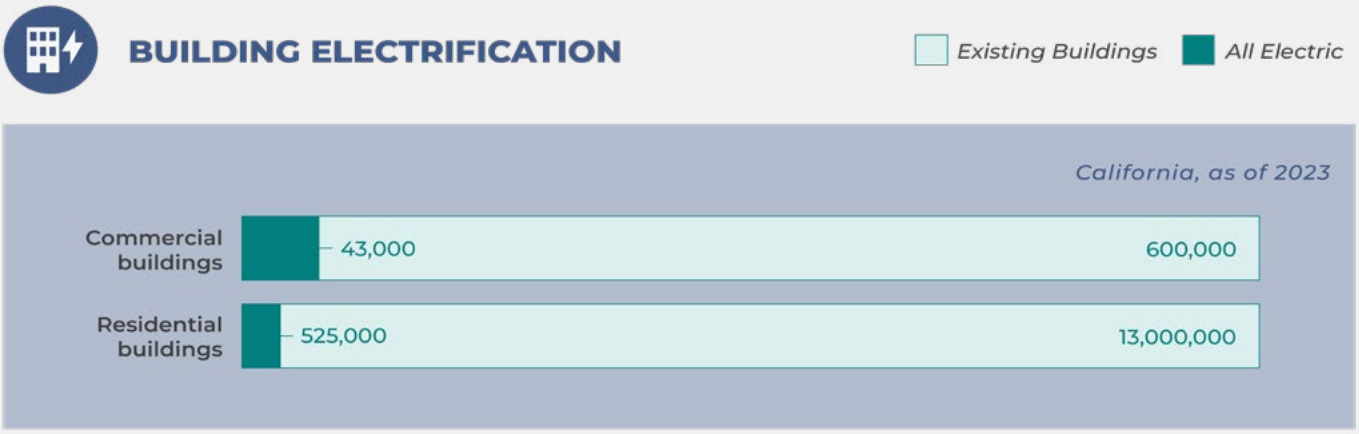
2.2 Progress Toward Policy Goals

The following shows quantifiable progress toward the abovementioned goals in building electrification and energy efficiency.

California

The National Renewable Energy Laboratory (NREL) has tools that estimate building energy consumption by fuel type. The ComStockTM modeling tool covers commercial buildings and ResStockTM models residential buildings. ComStock reports that as many as 43,000 commercial buildings (7%) in California are all-electric and use no natural gas or other fossil fuels onsite. ResStock states that 525,000 residential buildings (4%) in California burn no natural gas, propane, or fuel oil onsite.[47]

Figure 11: Progress Toward All-Electric Buildings



This 2022 baseline-modeled data showing only 4–7% of existing buildings are all-electric demonstrates the opportunity for green jobs to retrofit over 90% of these buildings.

2.3 Potential Green-Blue Jobs Projects

In the building sector, the most cost-effective path to decarbonization involves transitioning existing buildings from natural gas-fueled appliances to energy efficient electric appliances and ensuring new construction has all-electric equipment. To fulfill the environmental policy goals listed above, the following building electrification and energy efficiency projects will create green jobs in Richmond.

- Building electrification retrofits: in existing residential and commercial buildings, replace equipment that runs on natural gas with electric
- Energy efficiency: install equipment that is more energy efficient in existing buildings
- Weatherization: install insulation in walls, roofs, floors, and air ducts
- New construction of all-electric Accessory Dwelling Unit housing
- New construction of all-electric tiny homes

2.4 Conclusion

While state and local environmental policies are in place to direct new construction to be all-electric, existing residential and commercial buildings offer an opportunity to bend down the curve of greenhouse gas emissions. Upgrading existing buildings to all-electric will benefit human health, air quality, and the climate.

CHAPTER 3
Sustainable Transportation

Transportation provides vitally important access to jobs, goods, services, and education. In support of equity and improved public health, the interconnected network of public transit, private vehicles, and active mobility options should be accessible, safe, affordable, and clean.

Statewide, transportation contributes 38% of greenhouse gas emissions. California and Richmond are planning for an equitable transition to zero tailpipe emissions for cars, trucks, buses, and other vehicles powered by the increasingly clean electric grid. Transitioning to zero-emission vehicles and expanding options for active mobility will improve local air quality and public health outcomes, as well as reduce greenhouse gases that contribute to climate change.

3.1 Environmental Policies and Timeline

The following timeline of existing federal, state, and local policy objectives provides a common framework for guiding public- and private-sector transportation decisions and investments.

Figure 12: Policy Goals for Sustainable Transportation, by 2030

	By 2030
Federal	T F1 – By 2030, electric vehicles (EVs) make up at least 50% of new car sales, and there is a national network of 500,000 electric vehicle chargers along America's highways and in our communities (Executive Order 14037)[48]
	T F2 – By 2030, 30% of truck and bus sales will be zero-emission vehicles (Memorandum of Understanding the U.S. signed onto at the international climate meeting COP27 in Egypt in 2022)[49]
State	T S1 – By 2026, 35% of new cars sold will be plug-in hybrid electric (PHEV), electric vehicles, or hydrogen fuel cell. That proportion will rise to 68% by 2030. (Advanced Clean Cars II rule, California Air Resources Board)[50]
	T S2 – By 2030, 30% of truck and bus sales will be zero-emission vehicles (15-state Memorandum of Understanding)[51]
	T S3 – Public transit agencies will gradually transition to 100% zero-emission bus (ZEB) fleets. Beginning in 2029, 100% of new purchases by transit agencies must be ZEBs. (Innovative Clean Transit Regulation, California Air Resources Board)[52]
	T S4 – 1.5 million zero-emission vehicles on the road, 200 hydrogen fueling stations and 250,000 zero-emission vehicle chargers, including 10,000 direct-current fast chargers, by 2025 and 5 million EVs on the road by 2030 (Executive Order B-48-18 and Executive Order N-19-19)[53]
	T S5 – By 2030, reduce petroleum use in cars and trucks 50% from the 2015 consumption rate (Sustainable Freight Action Plan and Senate Bill 350)[54]

Local	T L1 – Encourage the use of available climate-friendlier vehicles and equipment to reduce energy use and carbon emissions and support the use of low-emission or renewable fuel vehicles by residents and businesses, public agencies, and City government (Richmond General Plan 2030, Policy EC2.1 Climate-Friendly Vehicles and Equipment)[55]
	T L2 – The City is committed to using Complete Streets principles and design to improve safety, amenities, and access for all types of transportation, including walking, bicycling, driving, and transit. Complete Streets improvements are recommended as part of an overarching Smart Growth strategy in dense urban areas, with a mix of uses to encourage people to safely walk, bicycle, utilize public transit, and accommodate motorists. (Climate Action Plan, 2016, Objective 3: Sustainable Transportation and Land Use)[56]
	T L3 – Revitalization of three major commercial corridors using Complete Streets principles and designs to improve safety, amenities, and access for all types of transportation, including walking, bicycling, driving, and transit (Richmond Livable Corridors Form-Based Code)[57]

Figure 13: Policy Goals for Sustainable Transportation, 2031–2040

2031-2040	
Federal	T F3 – By 2030, 100% zero-emission new truck and bus sales (COP27 Memorandum of Understanding)[58]
State	T S6 – By 2035, 100% of in-state sales of new passenger cars and trucks will be zero-emission (Executive Order N-79-20)[59]
	T S7 – By 2035, all new vehicles sold in the state to be plug-in electric vehicles or fully electric (California Air Resources Board approved)[60]
	T S8 – By 2035, 55% of delivery vans and large pickups, 75% of commercial trucks such as garbage trucks, and 40% of the big rigs sold in California must be emissions-free (Advanced Clean Trucks Regulation, California Air Resources Board)[61]
	T S9 – By 2040, all public transit agencies must transition to a 100% zero-emission bus fleet (Innovative Clean Transit Regulation, California Air Resources Board)[62]
Local	T L4 – By the year 2035, the Bay Area region must reduce emissions by 19% compared to 2005 levels. State law requires the Bay Area to cut per-capita carbon dioxide (CO2) emissions from cars and light trucks through coordinated transportation and land-use planning. (California Air Resources Board)[63]

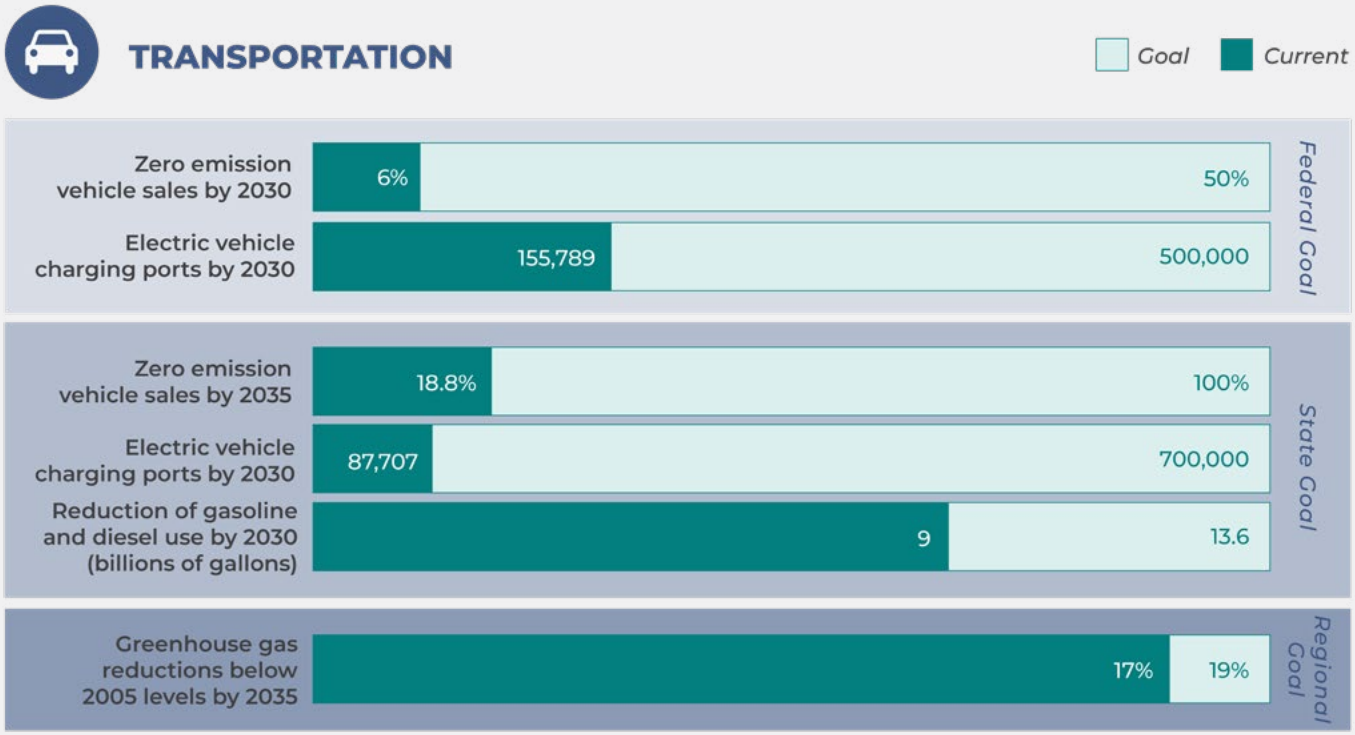
Figure 14: Policy Goals for Sustainable Transportation, 2041–2050

	2041-2050
State	T S10 – By 2050, 100% of truck and bus sales will be zero-emission vehicles (15-state Memorandum of Understanding)[64]
	T S11 – By 2050, 80% reduction in greenhouse gases below 1990 levels (Executive Order S-3-05)[65]
	T S12 – By 2050, reduction of transportation-related GHG emissions to 80% below 1990 levels (Senate Bill 350 and Executive Order B-30-15)[66]
	T S13 – By 2045, reduce oil use by 94% from 2022 levels (California Air Resources Board, 2022 Final Scoping Plan Update)[67]

3.2 Progress Toward Policy Goals

The following baseline data provides insight into progress toward a sustainable transportation future at the national, state, and local levels.

Figure 15: Sustainable Transportation Goals and Progress



United States

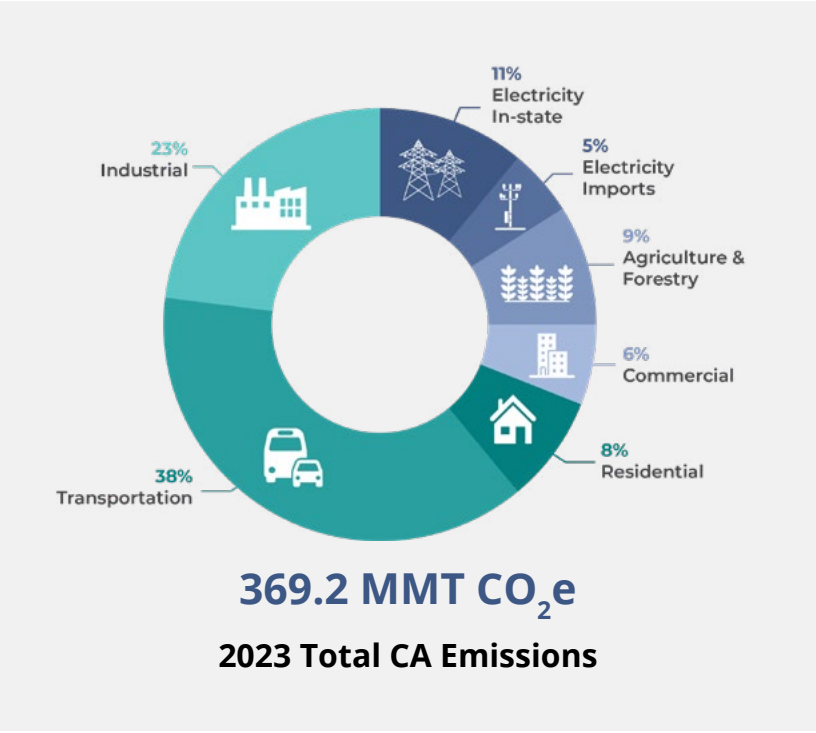
- **Zero-emission vehicle sales:** In 2022, 5.6% of U.S. vehicle sales were zero-emission vehicles. (Automotive News)
  >> Percent complete: 5.6% toward a goal of 50% ZEVs by 2030
- **Electric vehicle charging stations:** In 2023, there were 58,090 charging stations with 155,789 charging ports. (U.S. Department of Energy)
  >> Percent complete: 31% (155,789 charging ports out of the goal of 500,000 charging ports by 2030)

California

In California, 38% of greenhouse gas emissions come from the transportation sector, as seen in Figure 16. The following shows the state's clean transportation goals for reducing air pollution and the progress already made toward these goals.

- **Zero-emission vehicle sales:** In 2022, 18.8% of California's vehicle sales were zero-emission vehicles (California Air Resources Board)
  >> Percent complete: 18.8% (toward a goal of 100% ZEV sales by 2035)
- **Electric vehicle charging by 2030:** For passenger vehicle charging in 2030, over 700,000 public and shared private chargers are needed to support 5 million ZEVs as envisioned in the AB 2127 legislation. For the 8 million ZEVs anticipated by 2030 under the more ambitious Executive Order N-79-20 goals, nearly 1.2 million chargers will be needed for light-duty vehicles. An additional 157,000 chargers are needed to support the 180,000 medium- and heavy-duty vehicles anticipated for 2030. (CEC's AB 2127 biennial report)
  >> Percent complete: 13% (87,707 public and shared private EV chargers out of 700,000 public and shared private EV chargers by 2030) (California Energy Commission)

Figure 16: California Greenhouse Gas Emissions, 2020



Source: California Energy Commission

- **Reduction of gasoline and diesel use:** In 2022, 13.6 billion gallons of gasoline and diesel were sold in California
  >> **Percent complete:** 49% (reduction from 18 billion gallons in 2015 to 13.6 billion gallons in 2022 with a goal of 9 billion gallons by 2030)

Bay Area

- **Regional GHG reduction goal:** 19% reduction of greenhouse gases per capita below 2005 levels by 2035 (Metropolitan Transportation Commission)
  >> **Percent complete:** 17% reduction toward 19% reduction of greenhouses gases per capita

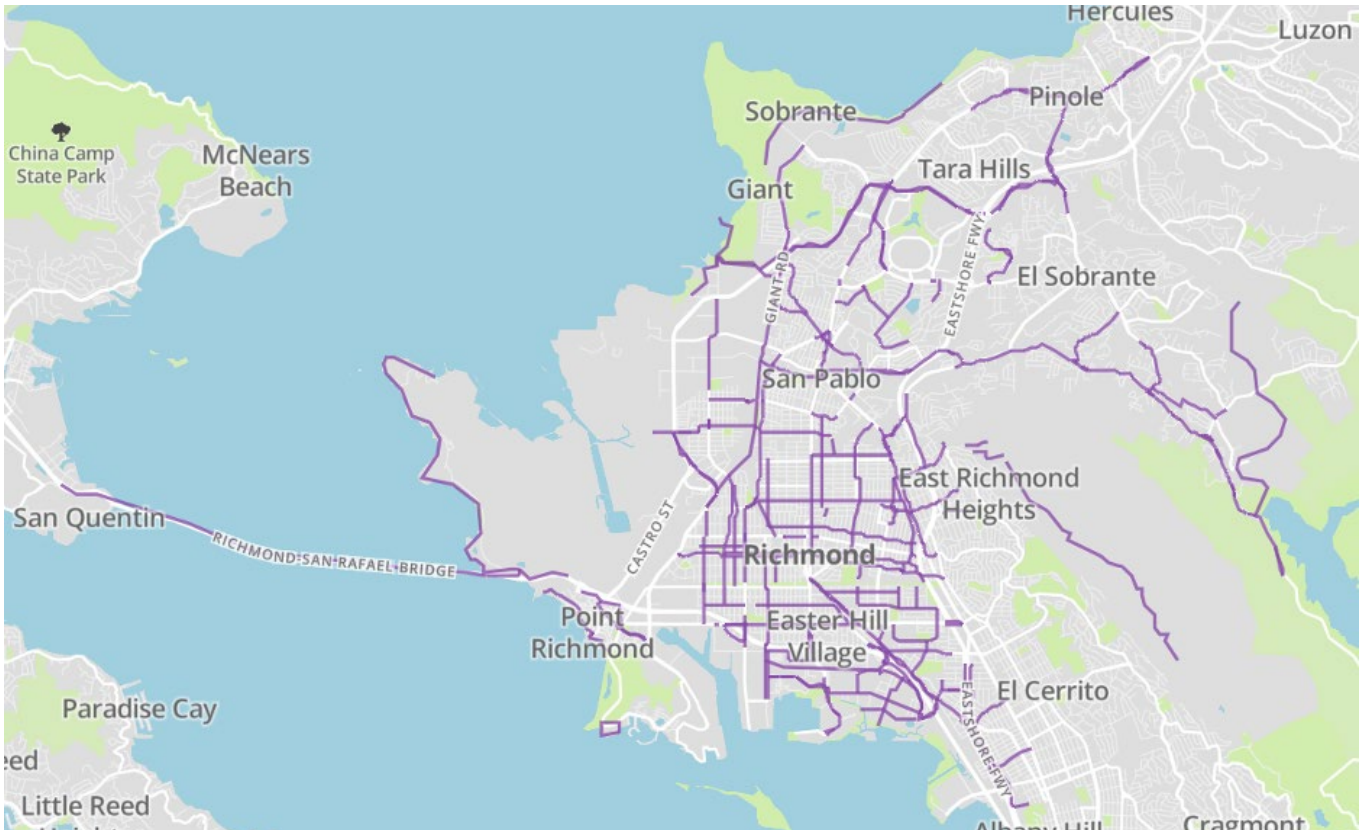
Richmond

Richmond has extensive train, bus, and ferry services but, like many cities in the Bay Area, connectivity to and between mass transit options is challenging. To close these gaps, priority projects in the 2019 Richmond First Mile/Last Mile Transportation Strategic Plan include:

- investments in walking and cycling infrastructure
- prevention of residential and business displacement and preservation and expansion of existing affordable housing
- increase in adoption of electric vehicles and electric mobility while addressing equity concerns and prioritization of investment in frontline communities
- medium- and heavy-duty vehicle electrification, including trucks and delivery vehicles, personal vehicle infrastructure in multi-family buildings, curbside charging, and school and transit buses
- use of car-free areas for active transportation, parks, and parklets, green infrastructure, pop-up communities, and commercial activity
- reduction of emissions from Port vehicles and equipment
- full electrification of drayage trucks
- yard trucks and cargo handling equipment
- transportation demand management

Building on the First Mile/Last Mile Transportation Strategic Plan, Richmond adopted a Bicycle Master Plan in 2011 and by 2016 installed 36 miles of bikeways toward a goal of a 145-mile network of bikeways throughout the city. Figure 17 shows the extensive network of additional bikeways that will enable mobility throughout the city.

Figure 17: Proposed Bikeways for Richmond



Source: Transparent Richmond [68]

Locally, the city and county agencies have been working hard to build out zero-emission charging infrastructure that will reduce GHG emissions:

- Richmond has 106 public charging stations, eight of which are free EV charging stations. This includes 47 Direct Current Fast Chargers, 34 of which are Tesla Superchargers. (PlugShare)
- The City of Richmond lists six public electric vehicle charging stations on their website
- Marina Bay Park has an EV ARC™ 2020 solar-powered EV charging station (Beam Global)
- Richmond Moves is an electric on-demand public shuttle that provides expanded access to efficient, equitable, and sustainable transportation in the community
- Miocar is an electric vehicle car-share program with four locations around Richmond. Chevy Bolts can be rented by the hour or day, and rental includes insurance, roadside assistance, and vehicle maintenance.

- As of 2023, public transit agency AC Transit operates an industry-leading zero-emission fleet of 58 battery electric and hydrogen fuel cell electric buses (AC Transit)
- AC Transit has been awarded $25.5 million from the 2023 Federal Transit Administration's Bus and Low- and No-Emission Grant Awards, which will allow them to acquire 25 hydrogen fuel cell electric buses, replacing traditional diesel engines and accelerating them toward California's requirement to be fully zero emission by 2040.

Local community-based organizations such as Rich City Rides (RCR) complement the work listed above by promoting cycling as a social, sustainable, and green mode of transportation. RCR teaches community members to fix bikes, organizes weekly rides in Richmond, and hosts activities that bring the community together.

3.3 Potential Green-Blue Jobs Projects

Building on the progress outlined above, the following potential sustainable transportation projects will build on Richmond's assets and strengths and move the city closer to federal, state, and local environmental policy goals.

- Transition to zero-emission vehicles
- Electric vehicle charging infrastructure: install and maintain
- Transportation management association: a non-profit that works to encourage drivers of single-occupancy vehicles to switch to trains, buses, carpooling, electric shuttles, and active mobility options (bicycling, scootering, walking)
- Destination downtown: recruiting aspiring entrepreneurs and attracting regional entrepreneurs to work together to develop a cluster of new businesses in one of Richmond's commercial areas

3.4 Conclusion

To achieve an 80% reduction of greenhouse gases below 1990 levels by 2050, expanding the number of zero-emission transportation options and enabling easy connections between transportation modes are vitally important. Federal and state governmental agencies are in the process of distributing infrastructure funding for local governments to support zero-emission transportation while also continuing to incentivize households to purchase personal electric vehicles. Switching to electric vehicles is also becoming more attractive as automakers expand the number of models with longer ranges – 250 miles or more between a charge – and as more electric vehicles become available in the secondary market.

From a transportation equity standpoint, though, members of lower-income households should be able to travel to work, school, and shopping without each adult needing to own a car. This is what makes the continued availability of mass transit, the expansion of shared shuttles, and infrastructure improvements for safer active mobility – walking, biking, scootering – valuable to vibrant and mobile communities.

CHAPTER 4
Zero Waste

Raw materials are essential for manufacturing the consumer goods we enjoy: clothing, furniture, electronics, appliances, and so forth. When those goods are no longer of use and, more often than not, thrown away, we say they are part of a linear flow of materials, from raw material extraction to use and then to landfill.

By reusing, repairing, sharing, leasing, recycling, and composting a higher percentage of materials, we move closer to a zero-waste closed loop and circular economy. This additional work to keep consumer goods in circulation longer creates more jobs and drives economic growth more than disposal of them in a landfill.

Another opportunity to reduce waste involves food. Throughout the entire food-supply chain – from production to processing, distribution, retail, and consumption – 30–40% of food raised and grown is wasted. At the same time, one in five Californians are food insecure, defined by the U.S. Department of Agriculture as the lack of "consistent, dependable access to enough food for active, healthy living." Diverting surplus food from large generators to feed people will improve food security as well as reduce greenhouse gas emissions that contribute to climate change.

4.1 Environmental Policies and Timeline

The following timeline of existing federal, state, and local policy goals inform public and private investment in the green jobs [essential to a zero-waste economy].

Figure 18: Policy Goals for Zero Waste, by 2030

	By 2030
Federal	ZW F1 – 50% of solid waste be source reduced, recycled, or composted by 2030 (U.S. Environmental Protection Agency)[69]
State	ZW S1 – Not less than 75% of solid waste be source reduced, recycled, or composted (Assembly Bill 341)[70]
	ZW S2 – Mandatory Commercial Organics Recycling Law requires businesses and public entities that generate two cubic yards or more of commercial solid waste per week, or is a multi-family dwelling of five units or more, to arrange for recycling services (Assembly Bill 1826)[71]
	ZW S3 – By 2025, every jurisdiction is required to provide organic waste collection services to all residences and businesses, reduce organic waste disposal by 75%, and rescue at least 20% of edible food that would otherwise go to landfill and can instead feed people (Senate Bill 1383)[72]
	ZW S4 – By 2025, not less than 20% of currently disposed-of edible food must be recovered for human consumption (Senate Bill 1383)[73]
	ZW S5 – To reduce methane emissions, the State of California seeks "to reduce organic waste disposal by 75% by 2025" (Senate Bill 1383)[74]
	ZW S6 – At least 30% of plastic packaging must be recycled starting January 1, 2028 and 40% on and after January 1, 2030 (Senate Bill 54)[75]
Local	ZW L1 – 90% of all solid waste is diverted from landfills and 100% of all schools have three-bin (garbage, recycling, and compost) recycling programs (Richmond General Plan 2030)[76]
	ZW L2 – The use of polystyrene foam and small plastics is restricted (Richmond Foodware Ordinance)[77]

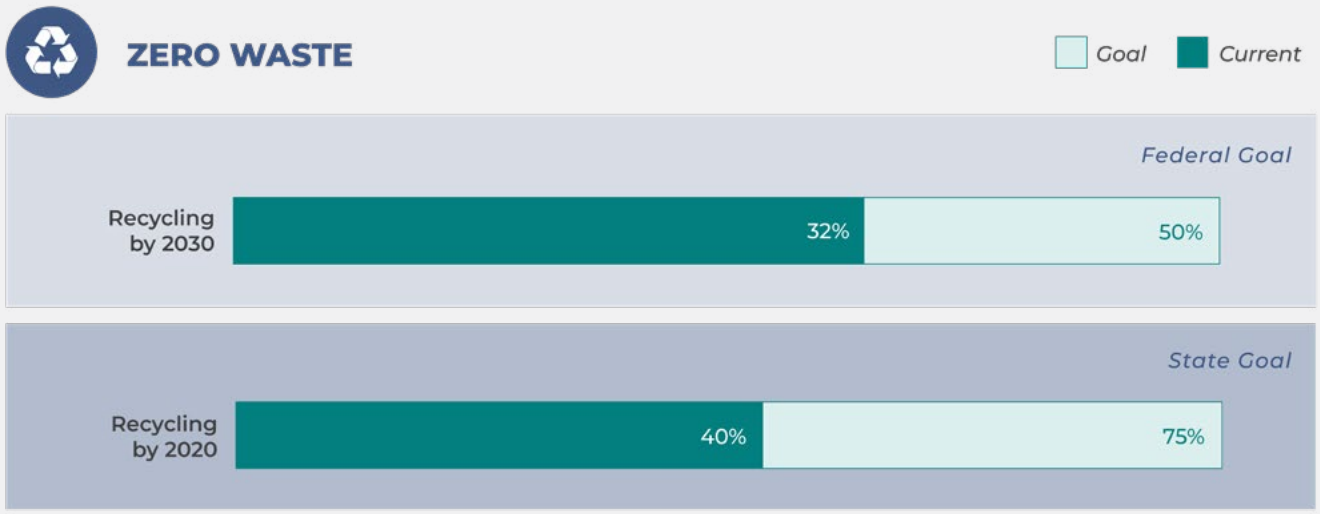
Figure 19: Policy Goals for Zero Waste, 2031–2040

	2031-2040
State	ZW S5 – All packaging in the state must be recyclable or compostable by 2032, cutting plastic packaging by 25% in 10 years and requiring 65% of all single-use plastic packaging to be recycled in the same timeframe (Senate Bill 54)[78]
	ZW S6 – Plastics manufacturers will pay $5 billion into a fund over the next 10 years (2022–2032) that would mitigate the effects of plastic pollution on the environment and human health, primarily in low-income communities (Senate Bill 54)[79]

4.2 Progress Toward Policy Goals

The following baseline data provides insight into the progress toward a zero-waste economy at the federal, state, and local levels.

Figure 20: Recycling Goals and Progress



United States

- **Federal recycling goal:** 50% of solid waste be source reduced, recycled, or composted by 2030
  - **>> Percent complete:** In 2018, 32% of the 292.4 million tons of solid waste was source reduced, recycled, or composted toward the goal of 50% by 2030 (U.S. Environmental Protection Agency)
- Food waste makes up 22% of all municipal solid waste (MSW), making it the single largest component of U.S. landfills (U.S. EPA)
- Each American produces about 4.9 pounds of trash in a single day (U.S. EPA)

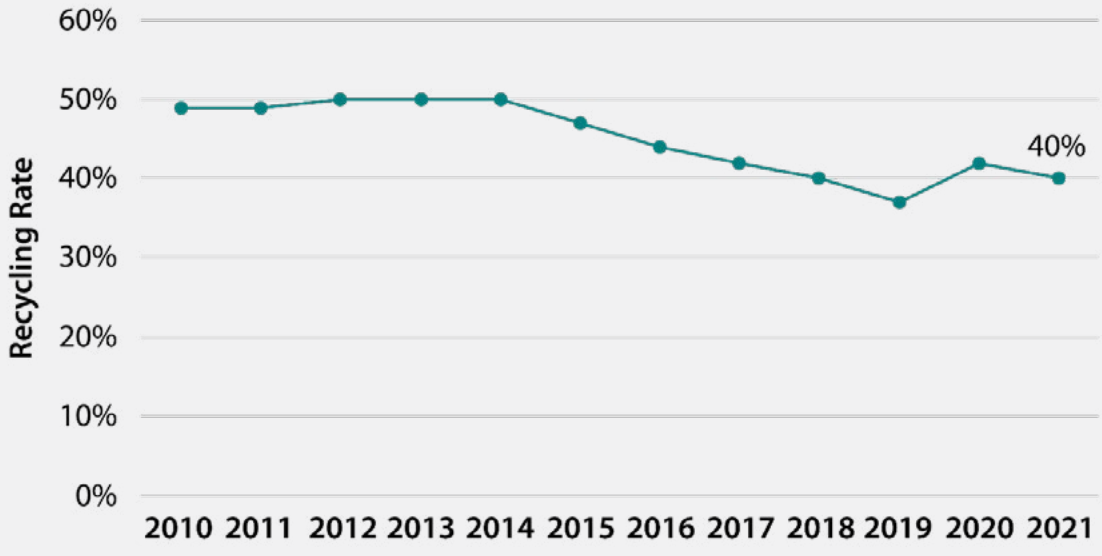
California

- In 2021, the recycling rate in California was 40%, down from 50% in 2014, as shown in Figure 21.
- In 2011, Assembly Bill 341 made a legislative declaration that "it is the policy goal, of the State of California, that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020." Even though the state only reached 50% diversion in the early 2010s, the 75% goal still stands.

  >> Percent complete: 40% toward the goal of 75%
- About eight million people in California face food insecurity (California Association of Food Banks)
- Over 18 months from the beginning of the pandemic to late 2021, food banks in California served over one billion pounds of food, a 74% increase from pre-pandemic levels (Richmond Confidential)
- During the pandemic, the number of California residents struggling with food insecurity rose from one in five to one in four (Richmond Confidential)

California sends over 1.5 million tons of potentially donatable food to landfills each year. See Figure 22 for the types and amounts of food that could potentially be donated to feed people. Recycling experts assert that the following percentages of the waste stream that are edible food could be applied to Contra Costa County as well.

Figure 21: California's Statewide Recycling Rate, 2010-2021



Source: CalRecycle

Figure 22: Food in California That Could Be Donated to Feed People

Food Potentially Donatable	% of Waste Stream	Tons/Year
Vegetative (perishable/fresh)	1.5%	615,133
Eggs, dairy, and dairy alternatives	0.2%	98,000
Meat	0.3%	111,229
Cooked/baked/prepared perishable Item	0.3%	114,977
Packaged non-perishable	1.4%	577,199

Source: CalRecycle[80]

The State of California has focused recent waste diversion efforts on composting organic materials and encouraging rescue of surplus food from large generators. There is also more to be done to prevent single-use disposable packaging waste by switching to reusable packaging, developing new product markets for recycling plastics and carpeting, and salvaging construction and demolition materials, among other projects.

Contra Costa County

- In 2014, the commercial sector in Contra Costa County generated 81,112 tons of food waste (CalRecycle)
- In 2021, 87,070 people or 7.5% of the population of Contra Costa County were food insecure (Feeding America)
- **Edible food diversion goal:** By 2025, not less than 20% of currently disposed-of edible food must be recovered for human consumption
  - **>> Percent complete:** 11.4% (3.6 million pounds or 1,800 tons edible food were diverted and redistributed by White Pony Express in 2022, out of 81,000 tons of commercial food waste generated in Contra Costa County [2014 CalRecycle number], 2.3% of target 20% diversion)
- In 2021, food recovery organizations and services in West Contra Costa Integrated Waste Management Authority's jurisdiction recovered 116,667 pounds (58.33 tons) of edible food (RecycleMore)

Richmond

- Richmond's overall recycling rate was 40% in 2021 (RecycleMore)
- The City of Richmond has a contract with Republic Services that provides recycling and composting services
- The City of Richmond is establishing a Zero Waste Framework designed to increase participation in recycling programs, establish garbage service rates and schedules that maximize participation in composting and recycling programs, increase diversion of construction and demolition waste, and promote school waste diversion programs
- Richmond-based Urban Tilth inspires, hires, and trains local residents to cultivate agriculture at seven school and community gardens and small urban farms, to feed the community, and to restore relationships to the land to build a more sustainable food system, within a just and healthier community. The non-profit's staff, interns, and volunteers grow and distribute 400 boxes of organic produce per week to Richmond families.
- On any given day in Richmond, 16,200 people go hungry (Richmond Confidential)
- Food Bank of Contra Costa and Solano provides free food directly to the community through a variety of programs and services. In 2022, they served over 258,000 clients per month, on average, in Contra Costa and Solano Counties (approximately 1 in 6 people), distributing 34 million pounds of food through 227 distribution sites with 6,700 volunteers.
- Greater Richmond Interfaith Program, Bay Area Rescue Mission, Catholic Charities, and others serve homeless, hungry, and low-income consumers by providing meals and other types of support

4.3 Potential Green-Blue Jobs Projects

- Building deconstruction firms
- Building salvage warehouse
- Remakery and fixery – afterschool enrichment and summer camps for K-12 students to spark creativity and innovation using tools and donated or salvaged items
- Re-entry entrepreneurs – building furniture from salvaged items
- Rescuing surplus food

4.4 Conclusion

Moving beyond 40% waste diversion and closer to the state's 75% waste diversion goal will create jobs that transform industries such as packaging, plastics, food, textiles, electronics, batteries, vehicles, and construction and demolition.

Within the food industry, we can solve two problems at the same time: food insecurity and food waste. By capturing and redistributing aesthetically imperfect produce, surplus packaged goods from grocery stores that are close to their freshness date, and leftover prepared food from large generators, we could feed more people living on the margins and reduce the amount of edible food thrown away.

As the public and private sector expand the number of diversion and prevention programs to build a zero-waste economy, we will improve human well-being, promote social justice, reduce greenhouse gas emissions, and protect biodiversity.

CHAPTER 5
Green Infrastructure and Urban Forestry

Flooding, droughts, high winds, landslides, and other natural hazards pose major threats to Richmond. As part of climate change, these threats have compromised the ability of our natural systems – waterways, soils, forests, and wildlife populations – to bounce back from these shocks. When these systems function optimally, they buffer humans from natural hazards. It is in our best interest to restore nature to health and adapt the functions of these natural systems to serve our needs.

Human efforts in land conservation, greenways, permeable pavement, tree trenches, subtidal habitat restoration, and more bring natural features and processes into cities, landscapes, and seascapes. These locally adapted, resource-efficient, and systemic interventions of natural features provide valuable social, economic, and environmental benefits.

5.1 Environmental Policies and Timeline

The year 2030 is an important date for federal, state, and local goals to protect and restore natural lands and waterways.

Figure 23: Policy Goals for Nature-based Solutions, by 2030

	By 2030
Federal	N F1 – By 2030, at least 30% of lands and waterways shall be conserved (Executive Order 14008, Section 216)[81]
State	N S1 – Commits to conserving at least 30% of lands and coastal waters by 2030, expanding nature-based solutions, and calling for restoring nature and landscape health, public health and safety, and securing food and water supplies (Executive Order N-82-20)[82]
Local	N L1 – Protect and expand tree resources in Richmond (Richmond General Plan 2030, Policy CN6.2)[83]
	N L2 – Many of the natural resources in the City are preserved, but some sensitive areas such as wetlands, baylands, marshes, creeks, and riparian areas need to be protected and restored. Particularly along the shoreline and in the hills, there are undeveloped areas that contain sensitive natural habitats that should be preserved and restored. (Richmond General Plan 2030, Conservation, Natural Resources, and Open Space, Finding 1)[84]

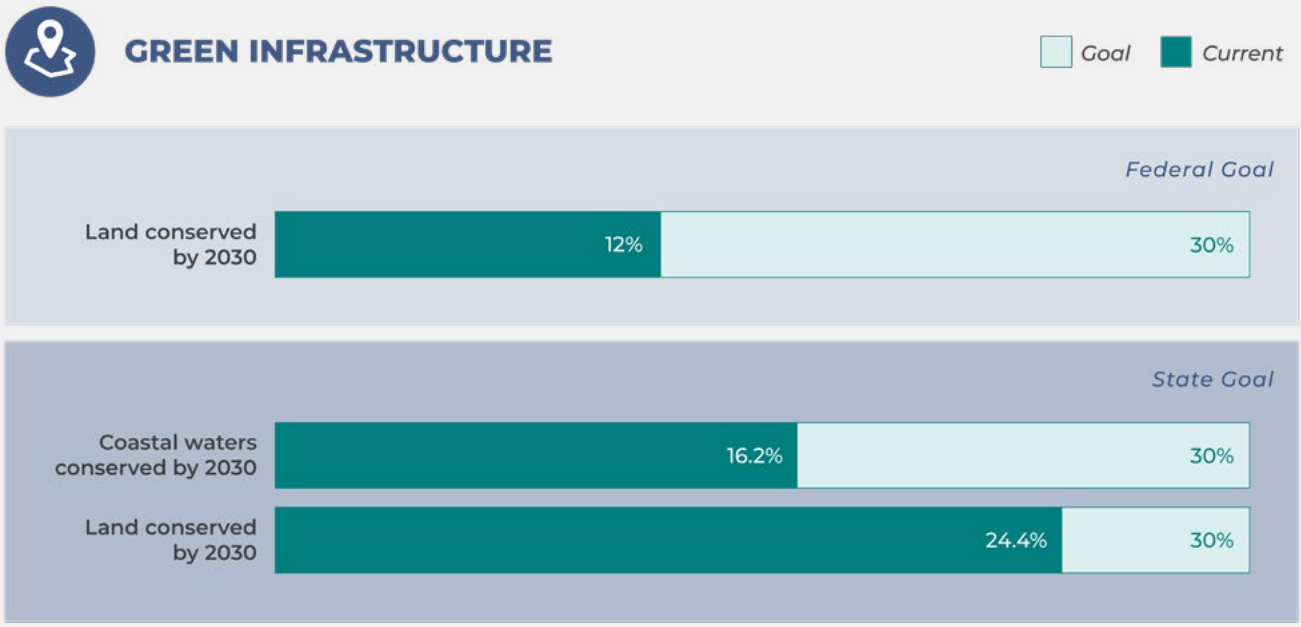
California's work to conserve 30% of lands and coastal waters (30x30) influenced federal efforts on this topic. On October 7, 2020, California Governor Gavin Newsom signed an Executive Order establishing a California Biodiversity Collaborative and setting a goal of conserving at least 30% of the state's land and coastal waters by 2030 to combat the biodiversity and climate crises. After the Governor announced the 30x30 conservation goal, lively discussion ensued about what "conserve" meant.

Then, on January 27, 2021, the Biden Administration released Executive Order 14008, which directs the California Natural Resources Agency (CRNA) to coordinate the implementation of 30x30 with other state agencies and stakeholders through a series of actions, including the development of a strategy document called the Pathways to 30x30 California.

5.2 Progress Toward Policy Goals

The following baseline data provides insight into the current state of efforts to restore nature at the national, state, and local levels.

Figure 24: Conservation Goals and Progress



United States

- **Land conservation:** At the national level, meeting the 30x30 goal of setting aside 30% of land for conservation would require 440 million more acres (National Geographic)
  - **>> Percent complete:** 289 million acres [12%] conserved out of the 729 million acres [30%] needed
- Currently, 12% of U.S. land and roughly 23% of U.S. oceans are conserved as protected areas (U.S. Department of the Interior).
- The federal government owns about 640 million acres of land, which is 28% of all the land in the U.S. A portion of this federal land is not managed in a way that meets the 30x30 standard, in part because resources are regularly extracted from portions of it. (National Geographic)
- Meeting the 30x30 target will require improvement of conservation efforts on land that sits in private hands. Individuals or companies own around 70% of land in the U.S. About two-thirds of species on the U.S. endangered species list are found on privately-owned lands, and around half of the country's forests considered usable for carbon storage sit on private property. (National Geographic)
- Sixty percent of lands in the continental U.S. are in a mostly natural condition or could be restored (Road to 30)

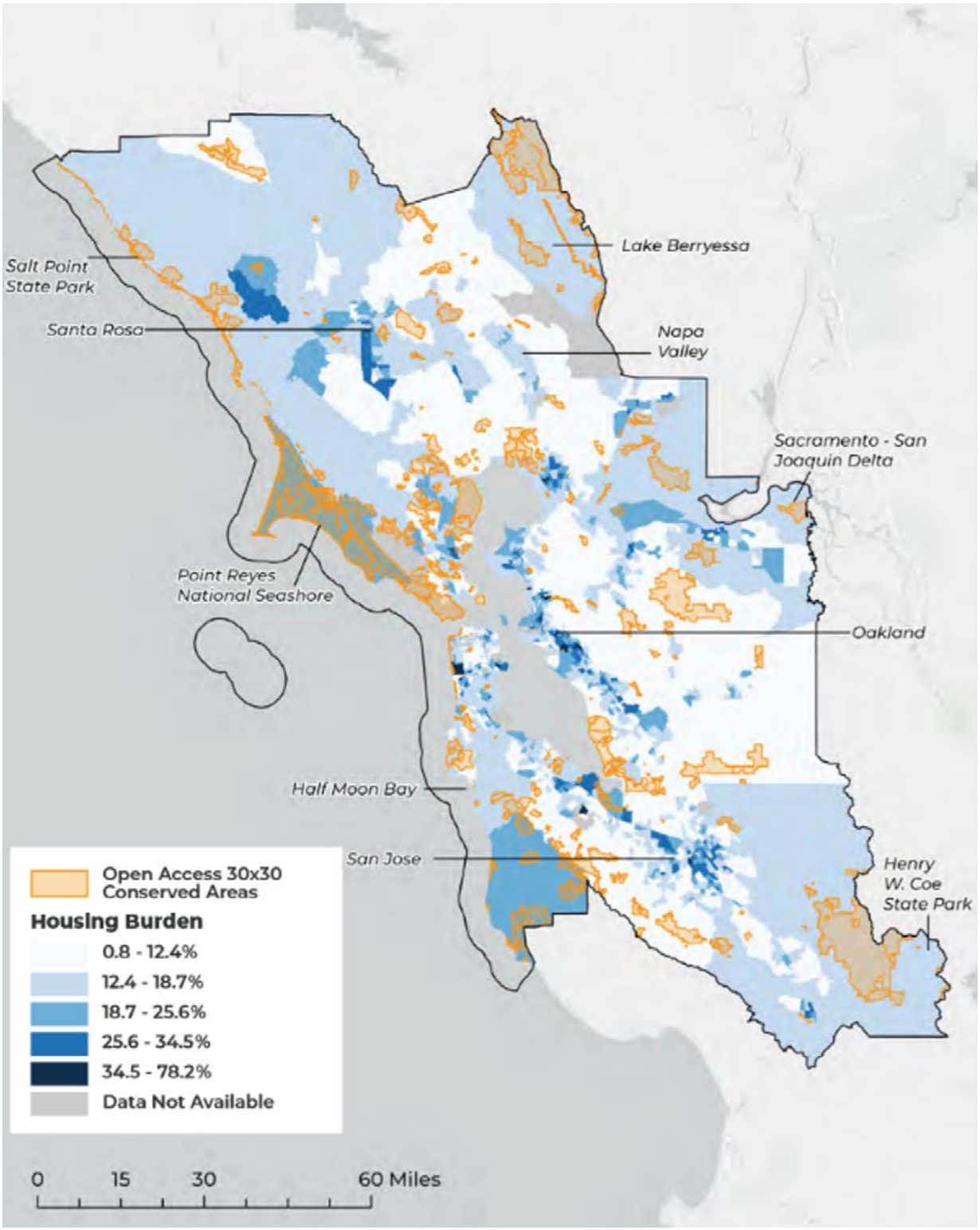
California

- **Land conservation:** At the state level, protecting 30% of California land will require an additional six million acres to be conserved (Office of Governor Newsom)

  >> Percent complete: 24.4% toward the 30% conserved goal
- **Coastal waters:** Conserving an additional half million acres of coastal waters will bring the total up to 30% (Office of Governor Newsom)

  >> Percent complete: 16.2% toward goal of 30% conserved
- California contains 36 of the world's biodiversity hotspots due to the high concentration of unique species and ecosystems experiencing unprecedented threats (Office of Governor Newsom)
- Since April 2022, California has added approximately 631,000 acres of conserved land – nearly 1,000 square miles – bringing the statewide total to 24.4% of lands and 16.2% of coastal waters (Office of Governor Newsom)
- Conservation areas in the San Francisco Bay Area that meet California's 30x30 standards are outlined in Figure 25. The following graphic overlays housing burden, which refers to the proportion of households within a census tract that are both low-income and spend a high proportion of their income on housing costs.

Figure 25: Open Access Conserved Areas in the Nine County Bay Area



Source: Pathways to 30X30 California[85]

The Pathways to 30x30 California team discovered that communities with higher rates of housing burden may face barriers accessing nature, such as:

- financial burden of transportation from urban centers to natural areas
- a region-wide rise in user demand for parks, trails, and open space
- the need for signs and outreach materials translated into Spanish and other languages

Improving green spaces in low-income communities and expanding access to regional natural areas are identified as priorities in the state's Pathways 30x30 California plan.

Richmond

- Richmond contains over 6,500 acres of parks and open space, including local, regional, state, and national resources. Around 5,700 acres of parkland are owned and operated by regional agencies and are located along the shoreline and in the East Bay Hills. The City owns approximately 250 acres of compact, neighborhood, and community parks and 510 acres of open space clustered mostly in El Sobrante Valley, Point Richmond, and Point Molate, which provide valuable recreational linkages to regional trails. (Richmond General Plan 2030)
- In 2023, the City of Richmond and community partners such as Urban Tilth, Rich City Rides, GRID Alternatives, and Trust for Public Land secured a $35 million grant from the Strategic Growth Council for a collection of sustainable projects called Richmond Rising. Projects include: expanded electric bike share with new docking hubs, new e-bikes, and memberships for residents; a new accessible community garden; tree canopy investment of up to 1,000 new street trees and 400 fruit trees; water catchment and greywater systems in 80 homes; solar power for 250 homes; and energy-efficient appliances. Green infrastructure will provide extensive new bicycle and pedestrian features and stormwater capture throughout the neighborhoods, and the project will include job training in community health promotion, solar installation, water conservation, urban forestry, and expansion of the existing City of Richmond employment and training programs. A Youth Fellows leadership program will help ensure the project is led by the community and is for the community of Richmond.
- Tree planting: The City's July 2013 tree inventory identified 22,051 existing trees and available planting areas for 13,000 additional trees (Richmond

Urban Greening Master Plan, 2017)

- The Richmond Greenway project reclaimed the abandoned railroad tracks running through South Richmond for community residents. This green space has been restored and is maintained by hundreds of neighborhood volunteers. Groundwork Richmond is a local trust that has implemented partnership programs such as the Richmond Greenway projects and other urban forestry programs.
- The North Richmond Shoreline Living Levee Project secured a $644,000 grant for planning and community engagement. The project includes technical studies, data collection, development of conceptual designs, cost estimates, engaging the public, key stakeholders, and involvement of the regulatory community. The project was awarded a $50,000 augmentation to add a tribal engagement storytelling component.
- The Watershed Project has constructed 14 bioswales and rain gardens along the Richmond Greenway to absorb stormwater and reduce surface water pollution.
- In 2013, the Watershed Project built 100 oyster reef balls at Point Pinole Shoreline with the help of Dixon Marine Services. The reef balls were split into four reef areas composed of 25 balls each. In the fall of 2014, biannual monitoring of the native oysters on the reef balls began. In 2021–2022, volunteers conducted the monitoring in December and April.
- The 2017 Urban Greening Masterplan includes urban greening goals – such as expanding the urban forest, updating the City's tree ordinance and city-owned tree policies, and reappointment of the Urban Forest Advisory Committee – and recommendations for achieving these goals.
- Local non-profits such as Groundwork Richmond, Pogo Park, the Watershed Project, and Richmond Trees – with funding from the California Department of Forestry and Fire Protection and the City of Richmond – have planted trees throughout the city since 2012. The Watershed Project has planted over 350 trees in the Coronado, Santa Fe, Booker T, and North Richmond neighborhoods.
- Urban Nature Loop is a self-guided walking tour of North Richmond. This project stretches between Verde School along Wildcat Creek Trail to Fred Jackson Way, Chelsey Ave through Shields Reid Park, and back to Verde School on Giaramita St, with extensions to the Fish Passage and Urban Tilth's Farm.
- Pogo Park transforms dispirited city parks and playgrounds into safe,

healthy, and magical outdoor public spaces for children to play and for the community to gather.

- YES Nature to Neighborhoods creates access for youth and families to spend more time together outdoors and thus foster healthier communities. In their 2020–2021 fiscal year, the organization tracked 1,262 volunteer hours, 416 community members engaged, 351 hours of physical activity, 66 days in nature, and 47 community partners.
- ouR-HOME is a suite of projects that will improve the resilience of North Richmond and build health, wealth, and home ownership opportunities for over 5,000 residents. Projects include a horizontal levee, planting 20,000 trees to filter air and water, small-lot housing, a community land trust, and social-impact bonds.

5.3 Potential Green-Blue Jobs Projects

Projects that will grow the number of green-blue jobs in Richmond include the following:

- Expanding the tree canopy
- Living levee: gently sloping, vegetated area that serves as a transition between tidal wetlands and terrestrial uplands, and protects the city by slowing storm-surge waters and absorbing floodwaters

5.4 Conclusion

Expanding the acreage of conserved land and waterways and implementing nature-based climate solutions will yield multiple benefits for nature and people. By increasing the amount of protected habitat, biodiversity will be enhanced, both the number and variety of species in various ecological niches. Furthermore, improving green spaces in low-income communities and expanding access to regional natural areas will benefit health for people of all ages.

CHAPTER 6
Land Use

The U.S. Environmental Protection Agency defines brownfields as "a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential of a hazardous substance, pollutant, or contaminant." Environmentally contaminated properties tend to be found in urban industrial areas and disproportionately affect working-class communities and/or communities of color. Brownfields are widely recognized as an environmental justice issue due to the range of potential hazards associated with the land.

In Richmond, leaking underground storage tanks, as well as more than a century of industrial and military activity, have resulted in soil contamination. Cleaning up brownfield sites to levels appropriate for future intended uses will provide safer and healthier environments for residents and workers. Doing so will also help attract businesses that will bring additional economic activity to the city and revitalize commercial corridors.

6.1 Environmental Policies and Timeline

Brownfield sites and Superfund sites are both areas of land that have been contaminated. The difference between the two is that for Superfund sites, the U.S. Environmental Protection Agency is involved and Superfund sites are on a list of the nation's worst contaminated sites, called the National Priorities List (NPL). The NPL guides the U.S. EPA in determining which sites warrant further investigation for environmental remediation.

Richmond's General Plan 2030 provides direction about brownfield cleanup but does not specify dates or numbers, as cited in Figure 26.

Figure 26: Policy Goals for Brownfields Revitalization, by 2030

	By 2030
Local	BR L1 – Continue to work with the appropriate local, state, and federal agencies to promote the cleanup and reuse of contaminated sites to protect human and environmental health (Richmond's General Plan 2030, Policy LU4.4 Toxic and Contaminated Sites)[86]
	BR L2 – The City will implement appropriate mitigation measures and cleanup of sites that are known to contain toxic materials (Richmond's General Plan 2030)[87]

6.2 Progress Toward Policy Goals

No target dates or number of target sites for clean up have been set for brownfield revitalization at the federal, state, or local levels, but abundant federal and state resources are available to the City of Richmond. The following baseline data provides insight into the current state of brownfield knowledge and site revitalization at the national, state, and municipal levels:

United States

- There are over 450,000 brownfield properties in the United States (U.S. Government Accountability Office)
- There are 1,336 Superfund sites on the National Priorities List (U.S. Environmental Protection Agency)
- The Brownfields Economic Development Initiative (BEDI) is a federal grant program to assist cities with redeveloping abandoned, idled, and underused industrial and commercial facilities. The U.S. EPA offers Targeted Brownfields Assessment, which is free technical assistance to research historical

property uses, conduct environmental sampling, and identify potential environmental concerns.

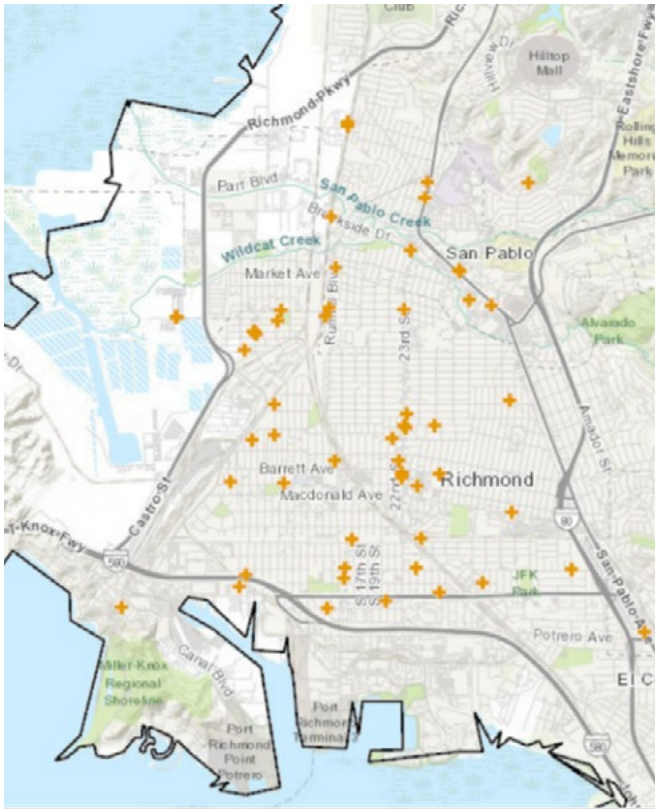
California

- California is home to almost 90,000 brownfield sites (California Environmental Protection Agency and Department of Toxics Substances Control)
- The California Department of Toxic Substances Control offers technical assistance and funding for brownfields cleanup through the Center for Creative Land Recycling

Richmond

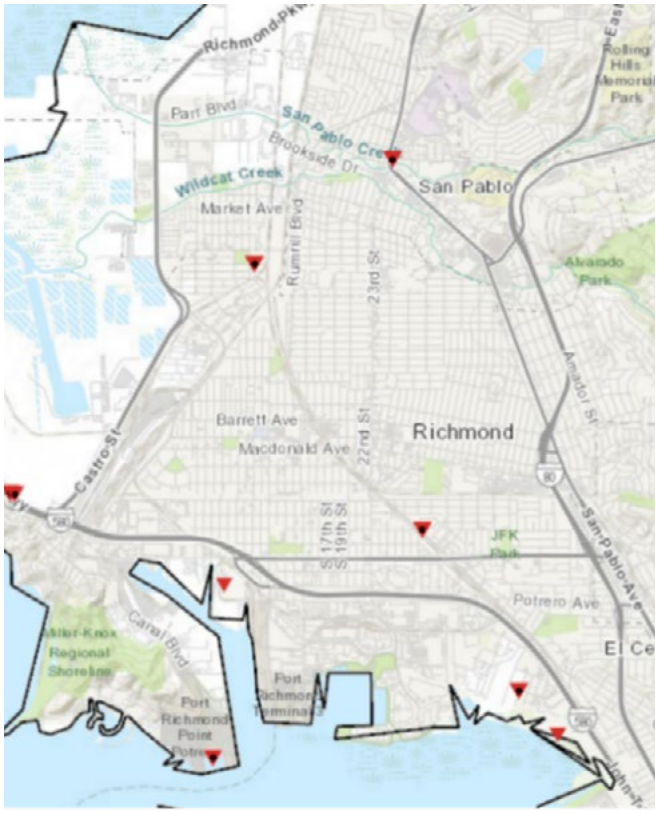
Soil-contaminated sites are a damper on real estate transactions and economic development. Figures 27 and 28 show U.S. EPA maps of distinct brownfield and Superfund sites in Richmond.

Figure 27: Brownfield sites in Richmond



Source: U.S. Environmental Protection Agency[88]

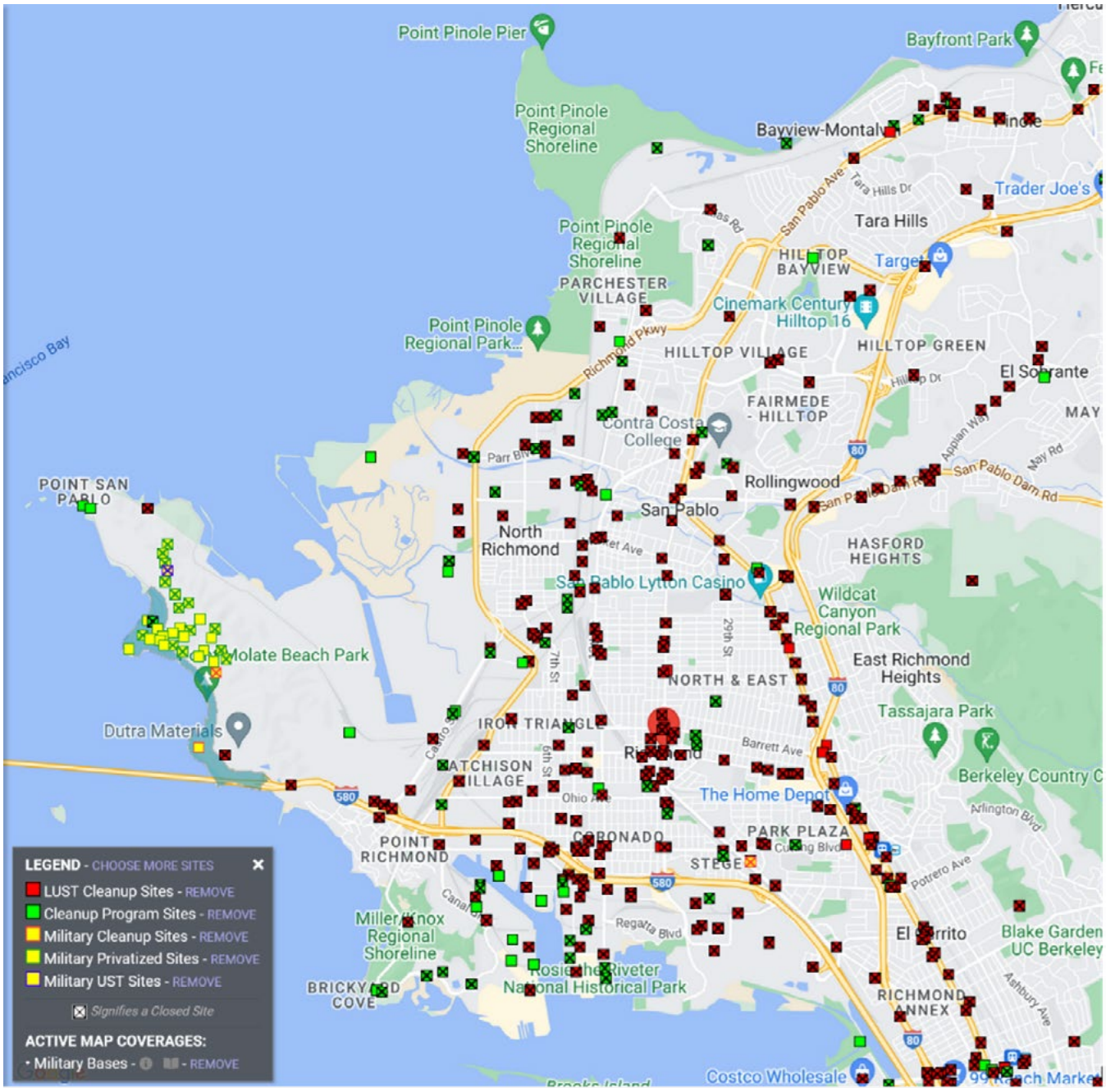
Figure 28: Superfund sites in Richmond



Source: U.S. Environmental Protection Agency[89]

When leaking underground storage tanks (LUST), as well as military and industrial brownfield sites are included, the number of brownfield sites in Richmond jumps to 442. See Figure 29 for the State of California's map.

Figure 29: Brownfield Sites in Richmond



Source: State Water Resources Control Board[90]

There has been some notable recent progress in this area. In 2020, the Richmond Community Foundation (RCF Connects) received a $300,000 Brownfields

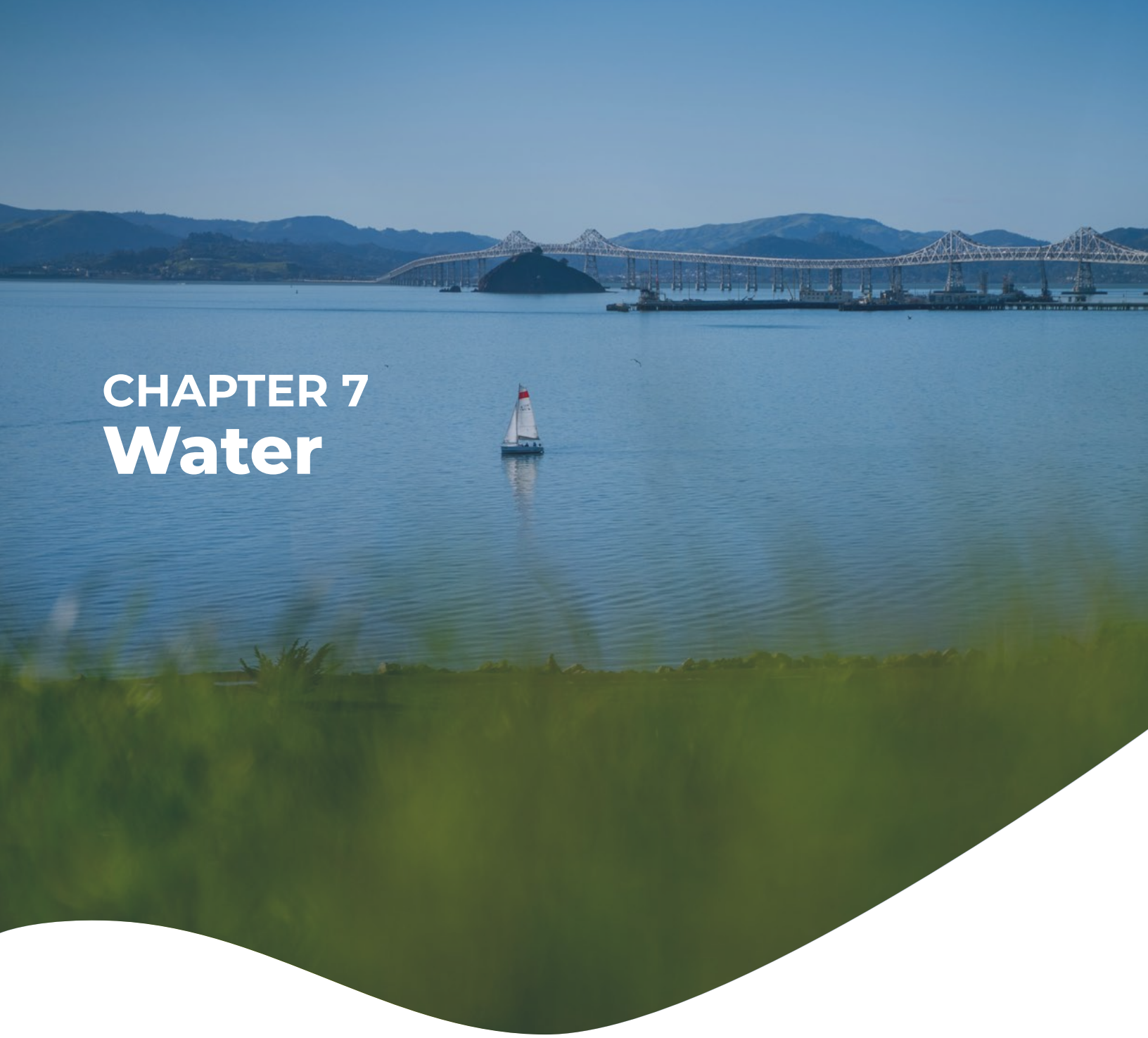
Assessment grant that is being used to assess abandoned and foreclosed properties in the Richmond neighborhoods of Belding Woods, Coronado, Iron Triangle, Pullman, and Santa Fe. Subsequent to property assessment, RCF Connects is leveraging funding from the Richmond Housing Renovation Program to clean up and redevelop these properties into homes for low- and moderate-income first-time homebuyers. This grant builds on previous brownfields grants to the City of Richmond. RCF Connects also has a U.S. Department of Energy grant that is funding solar panels, energy efficient equipment, and energy storage for these renovated properties.

6.3 Potential Green-Blue Jobs Projects

Brownfield cleanup requires intensive labor and financial resources at a time when there is uncertainty about which remediation technologies are most effective at protecting nearby human and environmental health. Studying and showcasing site remediation technologies could happen at a Brownfields Research and Innovation Hub.

6.4 Conclusion

The cleaning of a brownfield often results in the removal of a potential threat to human health or the environment, which in turn can unlock economic development opportunities. However, applying for, managing, and writing reports for federal and state grants requires considerable personnel resources. In the absence of federal and state timelines for cleanup, the City of Richmond's leadership has the opportunity to decide whether to prioritize brownfields cleanup.



CHAPTER 7
Water

Richmond's 32 miles of shoreline host historic infrastructure, industrial activities, housing, and protected natural areas. Water features prominently in Richmond's past as a shipbuilding powerhouse during World War II, the present as a deep-water port with nearby shoreline recreation areas, and the future role Richmond plans to play in the regional economy.

Topics touched on in this chapter include regulations and proposed regulations that will determine future activities at the Port of Richmond, types of jobs available, and the health of the environment and community.

7.1 Environmental Policies and Timeline

Federal and state goals and regulations that will affect green-blue jobs created in Richmond in the future are outlined in Figure 30.

Figure 30: Policy Goals for Water, by 2030

	By 2030
Federal	W F1 – Goods shipped between U.S. ports must be transported on ships built, owned, and operated by United States citizens or permanent residents (Jones Act, Section 27, Merchant Marine Act of 1920)[91]
State	W S1 – To reduce air pollution at ports, vessels are required to plug into electric shore power or capture and control emissions when sitting at port. Container, refrigerated cargo, and cruise ships have been included since 2014. These regulations will also apply to auto carriers starting in 2025 and oil and fuel tankers in Northern California starting in 2027. (Section 93130, Control Measures for Ocean-Going Vessels at Berth, Title 17 California Code of Regulations)[92]
	W S2 – New excursion vessels (sunset cruises, whale watching, etc.) will be required to be zero-emission capable hybrid, and 30% of their power must be derived from zero-emission sources by January 1, 2025 (California Commercial Harbor Craft regulations)[93]
	W S3 – New and in-use short-run (less than 3 nautical miles) ferries will be required to be zero-emission by January 1, 2026 (California Commercial Harbor Craft regulations)[94]
	W S4 – Goal of recycling and reusing at least 800,000 acre-feet of water per year by 2030 (Water Supply Strategy [proposed], California State Water Resources Control Board)[95]

7.2 Progress Toward Policy Goals

- The Port of Richmond is working to install electric shore power that will enable vessels to plug in to the electricity grid while at port
- Water Emergency Transportation Authority (WETA) is planning to expand their fleet and switch over to zero-emission ferries
- Richmond Shoreline Alliance is a coalition of Richmond-area residents, organizations, and allies dedicated to environmental justice, environmental protection, and an accessible and healthy Richmond shoreline now and for future generations
- San Francisco Bay Shoreline Contamination Cleanup Coalition – The Richmond Shoreline Alliance is part of this coalition that mobilizes for the safe, comprehensive, and immediate cleanup of all hazardous and

radioactive contamination near the San Francisco Bay shoreline, where sea level rise due to the climate crisis will spread the contamination

- North Richmond Shoreline Adaptation Project – West County Wastewater District's (WCWD's) wastewater treatment plant is at increased risk of flooding due to sea level rise and is pursuing collaborative, multi-objective, nature-based solutions on and off its property in order to achieve greater habitat benefits and increased flood protection. This project builds on the work of recent shoreline planning efforts focused on preservation and resilience, including:
  - The North Richmond Shoreline Community Vision Project – led by the San Francisco Estuary Partnership and completed in 2017. It combined transition zone mapping with strategies for protecting and improving ecosystem services, community health, economic stability, local jobs, education opportunities, safe places for recreation, and vibrant natural habitats. The North Richmond Shoreline Community Vision Project highlighted the WCWD living levee concept as a recommended near-term project.
  - ouR-HOME Project – The Resilient by Design (RbD) Bay Area Challenge, completed in 2018, dispatched 10 multidisciplinary teams to 10 shoreline areas in the San Francisco Bay to develop innovative site-specific approaches toward achieving community resilience to sea level rise. The design firm Mithun was assigned to North Richmond and worked with a local Citizen Advisory Board to dig deeper into the concepts and project opportunities identified in the North Richmond Shoreline Community Vision Project. The Mithun final report identifies the living levee concept and measures to improve shoreline local public access and recreational opportunities as priorities. It further recommends that the "West County Wastewater District's levee strategy would be coordinated and extended within the greater shoreline to protect the North Richmond neighborhood and existing and planned industrial uses from sea level rise."
  - Working Waterfront Coalition is an industry-led initiative that seeks to create a pipeline of ship maintenance and repair workers. With a $500,000 grant from the California Workforce Development Board's Workforce Accelerator Fund, partners seek to launch an 8- to 10-week course for 30 students.
  - Blue Frontier is a Richmond-based citizen engagement non-profit that protects the ocean, coasts, and communities – both human and wild –

that depend on them.

- Point Molate Alliance is a Blue Frontier project that, in 2010 (as Citizens for a Sustainable Point Molate), helped defeat plans for development on the publicly owned 422-acre natural headlands and waters that include 180 acres of pristine eelgrass beds in San Francisco Bay.

7.3 Potential Green-Blue Jobs Projects

Based on these policy goals and progress, the following water-related projects could create green-blue jobs in:

- Blue tech incubator and accelerator
- Port upgrades including electrification
- Berthing vessels at the port
- Electric ferry network
- Boat building
- Training center for boat maintenance and repair
- Shoreline ecotourism

7.4 Conclusion

A large portion of Richmond's economy revolves around the waterfront and shoreline. City leadership has an opportunity to grow its economy in the future while helping the state realize its environmental goals.

Source: U.S. Department of Energy

Report Conclusion

Building a just, equitable, resilient, and sustainable future will require changing the way many of our systems operate. Upgrading systems to be more efficient, less wasteful, and less dependent on burning fossil fuels, restoring the health of natural systems, and cleaning up historic pollution is work that cannot be outsourced or automated. These projects require local labor.

To determine which green-blue jobs will be in demand in the future, this report identifies the gaps between our environmental policy aspirations and where we are today. On some topics at the national, state, and local levels, we are close to reaching our goals. For others, we are just getting started.

Appendix

Glossary

TERM	DEFINITION
AB 32-regulated sources	any source, or category of sources, of greenhouse gas emissions whose emissions are at a level of significance, as determined by the state board, that its participation in the program established under this division will enable the state board to effectively reduce greenhouse gas emissions and monitor compliance with the statewide greenhouse gas emissions limit (Assembly Bill 32)
Accessory dwelling unit	a smaller, independent residential dwelling unit located on the same lot as a standalone single-family home (American Planning Association)
Affordable housing	housing for which the occupant is paying no more than 30% of gross income for housing costs, including utilities (U.S. Department of Housing and Urban Development)
Area median income (AMI)	the midpoint of a specific area's income distribution calculated on an annual basis by the Department of Housing and Urban Development (HUD)
Battery electric vehicles (BEV)	a vehicle powered by an electric motor that draws electricity from a battery (U.S. Department of Energy)
Bike lanes: Class I paths, Class II lanes, Class III boulevards, Class IV cycle tracks	Class I bikeways (bike paths) are facilities with exclusive right of way, with cross flows by vehicles minimized (Caltrans). Class II bikeways (bike lanes) are established along streets in corridors where there is significant bicycle demand and where there are distinct needs that can be served by them (Caltrans). Class III bike boulevards provide a right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles (Richmond Bicycle Master Plan). Class IV cycle tracks are physically separated from motor traffic and distinct from the sidewalk (National Association of City Transportation Officials).
Biodiversity	all the different kinds of life found in one area – the variety of animals, plants, fungi, and even microorganisms like bacteria that make up our natural world (World Wildlife Fund)
Biodiversity hotspots	regions that contain a high level of species diversity, many endemic (native to a certain place) species, and a significant number of threatened or endangered species (Defenders of Wildlife)

Biomass	a renewable energy made from organic materials that comes from plants and animals; sources include wood and wood processing waste, agricultural crops and waste materials, garbage, and animal manure or human sewage
Blighted homes	a physical space or structure that is no longer in acceptable or beneficial condition to its community (Vacant Property Research Network)
Brownfield revitalization	the ability to prevent, assess, safely clean up, and sustainably reuse brownfields (U.S. EPA)
Brownfield site	a property in which its expansion, redevelopment, or reuse may be complicated by the presence or potential of a hazardous substance, pollutant, or contaminant (U.S. EPA)
Building electrification	the adoption of technologies that use electricity in place of natural gas or other fossil fuels, key examples of which include space heating, water heating, appliances, and other equipment
Building envelope improvements	measures such as insulation and air sealing that reduce the energy needed for space heating and cooling
Carbon neutrality	a state of balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks (European Parliament)
Carbon pollution-free electricity	electrical energy produced from resources that generate no carbon emissions (U.S. General Services Administration)
Carbon sequestration	the process of capturing and storing atmospheric carbon dioxide (U.S. Geological Survey)
Carbon-free and renewable energy	energy produced by a resource that generates no carbon emissions and is renewable, such as solar, wind, geothermal, eligible hydroelectric, biomass, and biowaste (Marin Clean Energy)
Carbon-free energy	energy produced by a resource that generates no carbon emissions, such as nuclear or large hydroelectric (Marin Clean Energy)
Centralized renewable energy	the classic standard power management model for the large power plants connected to the power system (U.S. Environmental Protection Agency)

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (U.S. Environmental Protection Agency)
Circular economy	a model of production and consumption that involves the sharing, leasing, reuse, repair, refurbishing, and recycling of existing materials and products for as long as possible (European Parliament)
Clean electricity grid	an electrical grid that applies modern information technology at all levels of the system to dramatically and cost-effectively improve performance and reduce environmental impacts (Americans for a Clean Energy Grid)
Climate-ready homes	a home or building that has been designed or modified to meet low-carbon and high energy efficiency standards and manage many of the risks related to climate change, such as heat-related illness, poor indoor air quality, and damage from flooding or windstorms (Port Moody, Canada, Climate Action Plan)
Closed-loop systems	production system in which any industrial output is capable of being recycled to create another product (U.S. EPA)
Coastal waterways	the waters of the Great Lakes, the territorial seas of the United States, and those waters directly connected to the Great Lakes and territorial seas (U.S. Coast Guard)
Commercial solid waste	all types of solid waste generated by a store, office, or other commercial or public entity source, including a business or a multifamily dwelling of five or more units (CalRecycle)
Community choice aggregation	local governments can procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission and distribution service from their existing utility provider (U.S. Environmental Protection Agency)
Complete Streets	an approach to planning, designing, building, operating, and maintaining streets that enables safe access for all people who need to use them, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities (Smart Growth America)
Compostable	any organic material that, when accumulated, will become active compost (CalRecycle)

Construction and demolition (C&D) materials	common C&D materials include lumber, drywall, metals, masonry (brick, concrete, etc.), carpet, plastic, pipe, rocks, dirt, paper, cardboard, and green waste related to land development (CalRecycle)
COP27	the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change, Paris Agreement, held in November 2022 in Sharm El-Sheikh, Egypt (United Nations)
Cost-burdened household	households that spend more than 30% of their income on housing and may have difficulty affording necessities such as food, clothing, transportation, and medical care (HUD)
Distributed renewable energy systems	technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power, which may serve a single structure, such as a home or business or may connect to a microgrid, such as at a major industrial facility, a military base, or a large college campus (U.S. Environmental Protection Agency)
Ecosystem	a single environment and every living organism and non-living factor that is contained within it or characterizes it (Biology Dictionary)
Electric retail sales	sales made directly to the customer who consumes the energy product
Eligible renewables	renewable energy sources including biodiesel, biomass, biomethane, fuel cells, geothermal, small hydroelectric, conduit hydroelectric, water supply or conveyance system, incremental hydroelectric, municipal solid waste combustion and conversion, ocean thermal, ocean wave, solar, tidal current, and wind (California Energy Commission)
Endangered species	plants and animals that have become so rare they are in danger of becoming extinct (U.S. Environmental Protection Agency)
Energy efficiency	use of less energy to perform the same task
Fair share of housing	the process in which every city and county in California is obligated by law to plan and zone for their fair share of 2.5 million new units of housing statewide – a process currently underway (Office of Governor Gavin Newsom)

First mile/last mile strategies	improvement of connection to public transportation for the portion of a transit user's trip that involves walking, driving, or another method to get to and from the nearest transit station or stop (City of Richmond, First Mile/ Last Mile Transportation Strategic Plan)
Food insecure	lack of consistent, dependable access to enough food for active, healthy living (U.S. Department of Agriculture)
Fuel cells	a device that generates electricity through an electrochemical reaction, not fossil fuel combustion
Fuel cell electric vehicle (FCEV)	a vehicle powered by hydrogen that has been converted to electricity by the fuel cell (U.S. Department of Energy)
Green hydrogen	carbon-free hydrogen produced by using renewable power to split water into hydrogen and water in electrolyzers
Greenhouse gases (GHG)	gases that trap heat in the atmosphere, such as carbon dioxide, methane, nitrous oxide, and water vapor (U.S. Environmental Protection Agency)
Greenway	a corridor of undeveloped land preserved for recreational use or environmental protection
Heat pump	technology similar to that found in a refrigerator or an air conditioner that extracts heat from a source such as the surrounding air, geothermal energy stored in the ground, nearby sources of water, or waste heat from a factory, and amplifies and transfers the heat to where it is needed (International Energy Agency)
Housing burden	the proportion of households within a census tract that are both low income and that spend a high proportion of their income on housing costs (California Office of Environmental Health Hazard Assessment, CalEnviroScreen)
Housing Element	part of a General Plan adopted by a city, town, or county that includes the goals, policies, and programs that direct decision-making around housing (Association of Bay Area Governments)
Key value chains	the combination of activities a business undertakes to move a product or service along its life cycle, including design, marketing, distribution, and customer support (The Balance)

Large (Tier 1) food waste generators	wholesale food vendors, food service providers, food distributors, and grocery stores that have produce, fresh grocery, and shelf-stable foods to donate (CalRecycle)
Medium and heavy-duty vehicles	a vehicle with a gross weight rating of more than 10,000 pounds registered with the California Department of Motor Vehicles (California Energy Commission)
Municipal solid waste	everyday items such as product packaging, yard trimmings, furniture, clothing, bottles and cans, food, newspapers, appliances, electronics, and batteries (U.S. EPA)
National Priorities List (NPL)	guides the U.S. EPA in determining which contaminated sites warrant further investigation for environmental remediation (U.S. EPA)
Nature-based solutions	actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefitting people and nature (International Union for Conservation of Nature)
Net zero carbon emissions	the balance between the amount of greenhouse gas produced and the amount removed from the atmosphere (National Grid)
Organic waste	includes food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges (CalRecycle)
Plug-in hybrid vehicles (PHEV)	a vehicle that can be powered by an electric motor that draws electricity from a battery and by an internal combustion engine (U.S. Department of Energy)
Raw materials	the basic material from which a product is made
Recycling	the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products (U.S. EPA)
Refurbish	to make an item or building look new again by painting, repairing, or cleaning

Regional Housing Needs Allocation Goal	the number of housing units assigned to every local jurisdiction that represents its share of the state's housing needs for an eight-year period (Association of Bay Area Governments)
Renewable methane	the gaseous product of decomposed organic matter that has been processed to purity standards
Reusable packaging	pallets, containers, and dunnage (interior packing materials) designed for reuse within a supply chain and constructed for multiple trips and extended life (Reusable Packaging Association)
Reuse	use of something multiple times in a variety of ways to reduce landfill waste and to decrease manufacturing needs
Riparian	of or relating to or located on the bank of a river or sometimes a lake or tidewater
Single-use plastic packaging	goods made primarily from fossil fuel–based chemicals (petrochemicals) that are meant to be disposed of after use (often in mere minutes); single-use disposable plastics are most commonly used for packaging and serviceware, such as bottles, wrappers, straws, and bags (Natural Resources Defense Council)
Smart Growth	an overall approach to development that encourages a mix of building types and uses, diverse housing, transportation options, development within existing neighborhoods, and robust community engagement (Smart Growth America)
Small hydro	hydroelectric power on a scale suitable for a small community or industrial plants
Source reduction	any practice that reduces, eliminates, or prevents pollution at its source prior to recycling, treatment, or disposal (U.S. EPA)
Superfund site	a hazardous waste site designated by the EPA for management and cleanup (U.S. EPA)
Tiny home	a small portable dwelling with 400 square feet or less of floor space that may have all the fundamentals of a house, such as kitchen, bathroom, bedroom, and living area

Transportation demand management	a general term for strategies that increase overall system efficiency by encouraging a shift from single-occupant vehicle (SOV) trips to non-SOV modes or shifting auto trips out of peak periods (Seattle Urban Mobility Plan)
Utility-scale electricity generation	electricity generation and capacity of electric power plants with at least 1,000 kilowatts or 1 megawatt (MW) of total electricity-generation capacity (U.S. Energy Information Administration)
Virtual power plant	consists of several small-scale distributed energy resources that are connected on a virtual network and can remotely coordinate these independent technologies to respond to grid needs (Marin Clean Energy)
Waste diversion	use of material for any purpose other than disposal in a landfill or transformation facility (CalRecycle)
Waste reduction practices	system in which waste is never created and therefore doesn't have associated costs, also known as waste prevention (CalRecycle)
Waterway	a way or channel for water; a navigable body of water
Zero-emission standard	zero-emission and near-zero-emission vehicles such as battery electric vehicles, hydrogen fuel cell vehicles, and plug-in hybrid electric vehicles, which have ultra-low smog-forming and greenhouse gas pollutants, even over the life of a vehicle, including the vehicle's fuel-production emissions
Zero-emission vehicle (ZEV)	vehicles that do not produce direct exhaust or tailpipe emissions (U.S. Department of Energy)
Zero-energy building (also Zero Net Energy and Net Zero Energy)	an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy (U.S. Department of Energy)
Zero waste	designing and managing of products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials and to conserve and recover all resources and not burn or bury them (CalRecycle)
Zero-carbon energy sources	energy sources like wind, nuclear and solar, which do not create carbon emissions when they are used to produce electricity (National Grid ESO)

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Community Outreach and Findings Report

Submitted to the City of Richmond City Manager's Office

June 15, 2023

Prepared by:

MIG

Appraccel

as part of the
Richmond Green-Blue New Deal Workforce Development Plan
https://www.ci.richmond.ca.us/4138/Green-Blue-New-Deal-and-Just-Transition

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Community Outreach and Findings Report

Introduction

The City of Richmond is ready to advance towards a safe, healthy, equitable, resilient, and sustainable future. The Richmond Green-Blue New Deal Plan (GBND) will establish strategic direction and programs that support community well-being, foster economic development, and reinforce environmental protection citywide. The City is actively supporting the process of developing a plan for a Richmond Green-Blue New Deal and Just Transition to 21st Century Jobs.[1] In developing this plan, the City of Richmond committed to designing and implementing an inclusive and dynamic engagement process to ensure the GBND is based on robust and genuine feedback from the community, civic and city leaders, labor leaders, and the private sector.

This Community Outreach and Findings Report has been prepared by MIG, Inc. for review by Appraccel, LLC and the City of Richmond City Manager's office. This report summarizes the community outreach activities and findings to help ensure a community-driven Richmond Green-Blue New Deal Plan (plan).

Overview

Outreach Goals and Objectives

The following goals and objectives were developed to guide community outreach and help ensure the Green-Blue New Deal plan will support the City of Richmond in achieving racially equitable community outcomes that foster a healthy and inclusive community for all.

- Leverage local networks and existing community engagement efforts. Build on the variety and depth of existing community involvement initiatives in Richmond to engage the public effectively and efficiently in the Green-Blue New Deal plan. Tap into existing community-based networks of local leaders and groups to connect with a wider range of community members.
- Identify barriers to participation. Cultivate an understanding of existing or potential barriers to the full participation of all community members, particularly communities of color and low-income populations, in developing the Green-Blue New Deal plan.
- Create opportunities for inclusive and equitable participation. Provide multiple and varied opportunities for a broad range of community members, businesses, and interest groups to share meaningful input.
- Collaborate and inform decision-making. Collect useful and relevant public input that reflects local expertise and values and informs decision-making related to the Green-Blue New Deal plan.
- Build long-term capacity for civic engagement around workforce development. Build social capital and support those engaged through the process to stay involved and share not only concerns and issues, but also solutions and strategies necessary to implement the Green-Blue New Deal plan.

Outreach Activities

A variety of outreach activities were conducted to ensure a broad range of community members and organizations had the opportunity to provide meaningful input.

[1] https://www.ci.richmond.ca.us/4138/Green-Blue-New-Deal-and-Just-Transition

- Community Champions. A dedicated group of Community Champions helped ensure the project is responsive to the interests and needs of the City and the community and refine the plan's goals and objectives.
- Community-based organization partners. Community-based organizations (CBOs) working in and serving the Richmond community partnered with the Richmond Green-Blue New Deal project by leveraging their existing networks in the Richmond community and facilitating outreach activities to collect input.
- Stakeholder workshops. Two workshops were facilitated to inform and engage Richmond businesses and industries and Contra Costa Building Trades unions to gather feedback, concerns, and priorities to inform the plan.
- Online and paper survey. A public survey was conducted to gather insights from the community about their vision and goals for the City and the plan. This survey was promoted by Community Champions, CBO partners, and the City of Richmond.

Major Themes and Feedback

Community Priorities

Across outreach activities, common themes and priorities emerged. Participants shared that the Green-Blue New Deal should:

- Benefit Richmond residents who need the most support including historically underserved and underinvested communities, Black, Indigenous, and People of Color (BIPOC) communities, the justice-involved community, and unhoused community.
- Ensure sustainable, long-term benefits for Richmond residents including health, employment, and housing stability benefits that have measurable outcomes and metrics to measure progress.
- Leverage and rely on the local expertise of community leaders and organizations when moving projects forward.
- Include and clearly detail high-quality labor standards, equitable hiring policies, and hiring preferences for local Richmond residents and justice-involved candidates.
- Carefully consider and monitor how sustainable improvements can have unintended consequences such as household expense increases for low-income households, producing unintended waste, and gentrification.
- Clearly outline plan implementation and evaluation logistics such as who will implement the plan, where funding for the plan could come from, who has decision-making power, how decisions will be data-driven and evidence-based, outcomes and metrics to measure impact on the environment, workers, and Richmond community members.

Although not reflected in the findings for individual outreach activities, during ongoing conversations the need for an environmental education curriculum or green-blue career readiness curriculum for young people was emphasized by stakeholders. This curriculum would ensure that Richmond's diverse student population develops a broad-based understanding of the green-blue economy and is well-positioned to benefit from future green-blue career opportunities.

Support for Green-Blue Projects

Across community outreach activities, there was support for a variety of potential green-blue projects. There is not a clear consensus on which specific projects should move forward but rather an emphasis

that the projects that do move forward should directly benefit the Richmond community by ensuring sustainable, long-term community benefits, building wealth and providing family-sustaining wages for workers, and supporting small, locally-owned businesses.

Key Partners to Engage in Plan Development and Implementation

The following stakeholders and organizations were engaged during the community outreach process and should continue to be involved as the plan is developed and implemented.

- The Richmond community at large would like to be updated through City communications and updates relayed through Community Champions and CBO partners on the plan progress. It will be important to continue to engage the community and incorporate feedback to build trust and maintain transparency throughout this project.
- The Council of Business and Industry, specifically Executive Director Katrinka Ruk, would like to remain engaged and updated as the plan is developed and collaborate where appropriate during implementation.
    - Sal Vaca is interested in remaining engaged to ensure the plan reflects equitable hiring policies and local hiring preferences for Richmond residents and justice-involved community members.
- The Contra Costa Building and Construction Trades Council members are very interested in partnering with the City on federal and state grant opportunities and advocacy opportunities related to green-blue projects. Unions that expressed the most interest in remaining engaged include:
    - Anthony Viscuso, Heat & Frost Insulators, Local 16
    - Dominic Lucero,Boilermakers 549
    - EJ Cire, Sheet Metal Workers Local 104
    - Felipe Hernandez Rios, UA LOCAL 355
    - Jason Lindsey, Ironworkers Local 378
    - Tim Frank, consultant with Contra Costa Building and Construction Trades Council
- Specific Community Champions engaged at a deeper level and have indicated interest in staying involved in development and implementation of the plan:
    - James McGarry, California Public Utilities Commission – energy and building electrification projects, policy projects
    - Juliana Gonzalez, The Watershed Project – nature restoration and preservation projects, transportation projects, brownfields projects, training and workforce development projects
    - Najari Smith and Jason Woody, Rich City Rides – transportation projects, policy projects, youth engagement
    - Wesley Alexander, CoBiz – training and workforce development projects
    - Katrinka Ruk, Council of Business and Industry – policy projects, energy projects, nature restoration and preservation projects
    - Dan Knapp and Mary Lou Deventer, Urban Ore – circular economy projects, training and workforce development projects
    - Bethany Kaufman, Rebuilding Together East Bay Network – building and construction projects, training and workforce development projects
    - Karen Collins, Food Bank of Contra Costa and Solano – food distribution projects

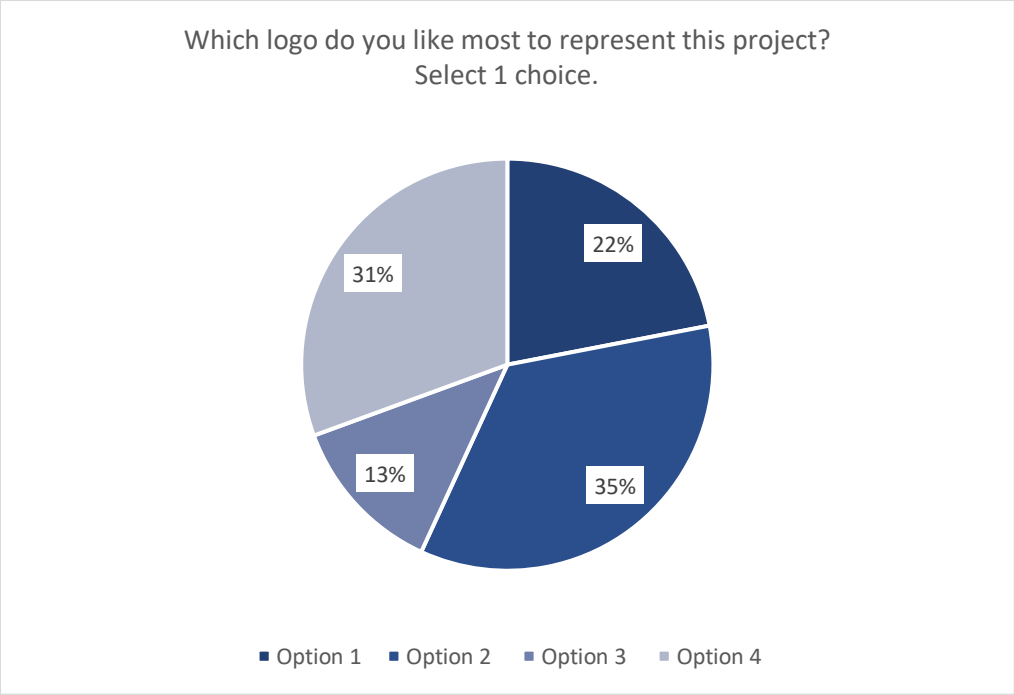
- Arleide Santos, Urban Tilth – food projects, nature restoration and preservation projects, training and workforce development projects
- Marisol Cantu, Richmond Progressive Alliance/Safe Return Project – circular economy projects, policy projects, training and workforce development projects

Project Logo

Survey respondents, Community Champions, and Safe Return Project workshop participants were asked to help select a logo for the Richmond Green Blue New Deal. Respondents indicated a preference for Option 2 (35%) and Option 4 (31%) below.

Option 2:

Option 4:



Community Champions

To help ensure the plan is responsive to the interests and needs of the City and to help guide and refine the plan's goals and strategies, a Community Champions team was convened early in the community engagement process. Community Champions include representatives from community-based organizations, workforce development and job training agencies, small businesses, and relevant industry areas.

Role and Responsibilities

The Community Champions who were selected met the criteria outlined below. Community Champions received an email invitation to participate.

- Champions are connected to or represent a specific subset of the Richmond community through a community-based organization or key group (small business, advocacy group, etc.)
- Champions have expertise in an area relevant to the types of projects that may result from the Green-Blue New Deal
- Champions are enthusiastic to collaborate on the Green-Blue New Deal
- Champions have a demonstrated interest and commitment to inclusive and equitable outcomes for the Richmond community

Community Champions and their respective organizations are listed in the table below in alphabetical order of the organization:

Organization	Name
1HundredYears	Lejon Reese
CoBiz Richmond	Wesley Alexander
Council of Business & Industry	Katrinka Ruk
Food Bank of Contra Costa & Solano	Karen Collins
GoToWork Fitness	Evan Francis
Marin Clean Energy (MCE)	JB (Jayme) Ackemann, Tyla Brown
Re-entry Success	Tiffany Anaya
Rebuilding Together East Bay Network	Bethany Kaufman
Renaissance Center	Nicole Levine
Rich City Rides	Najari Smith, Jason Woody
Richmond Community Foundation	Jim Becker
Cooperation Richmond	Princess Robinson, Briana Sidney
Richmond Main St Initiative	Andrea Portillo-Knowles
Richmond Neighborhood Coordinating Council	James McGarry
Richmond Progressive Alliance/Safe Return Project	Marisol Cantu
RichmondWORKS	Tamara Walker
Rising Sun Center for Opportunity	Juanita Douglas
Sims Metal	Jill Rodby
Urban Ore Inc	Dan Knapp, Mary Lou Van Deventer
Urban Tilth	Arleide Santos
Watershed Project	Juliana Gonzalez, Anne Bremirez

Community Champions were asked to participate in the following ways:

- Attend three (3) virtual meetings (2 hours in duration) with the Green-Blue New Deal (GBND) project team.
- Act in an advisory role to the GBND project team from October 2022 through June 2023. Help guide and refine the plan's goals and strategies to ensure the plan is responsive to the interests and needs of the community.
- Support outreach efforts for engagement opportunities to ensure the GBND is reaching the right people and represents a range of voices from across the community.

Compensation

Community Champions' time, expertise, and community involvement is incredibly valuable. To thank Champions for their time, they received a $100 stipend for each meeting attended.

Meeting Objectives

MIG facilitated three Community Champion meetings. The objectives for these meetings included:

- Meeting #1 (November 1, 2022): Facilitate introductions and relationship building for Community Champions and strategically map what expertise and connections Champions bring to the team.
- Meeting #2 (January 11, 2023): Discuss possible projects to be implemented in Richmond based on Champions' experiences, networks, and ongoing work within the community. Special presentation from Allison Moe with NREL on the Richmond Communities LEAP project.
- Meeting #3 (April 13, 2023): Discuss high-level survey findings, a definition for green-blue jobs in Richmond, and staying involved as the project moves forward.

The project team recommends convening the Community Champions for an additional meeting in late summer or early fall 2023 to understand how the community findings are informing the RGBND Opportunities Report and Community Toolkit. Champions will be compensated for attending this fourth meeting.

Findings

In addition to facilitating CBO partnerships, promoting the community survey, and guiding the community outreach process, the Champions provided specific input in key discussions summarized below.

Strategic Mapping

Champions were asked to identify where their work aligns with elements of the Green-Blue New Deal so the project team could identify which Champions should be included in ongoing discussions and should be leveraged regarding specific projects. These elements included:

- Training and workforce development
- Demand for goods and services
- Policy
- Funding
- Energy
- Buildings
- Transportation
- Circular economy
- Food
- Nature

- Brownfields

This strategic mapping exercise was documented using the notetaking tool Mural and is available in Appendix A.

Potential Green-Blue Projects

Champions were asked to brainstorm in teams one or two possible projects for the Green-Blue New Deal and discuss the alignment needed in the following areas for a project to successfully move forward:

- Stakeholders – Who are the key players in the community?
- Policy – What additional ordinance or resolution is needed to implement this project?
- Funding – What funding is needed to implement this project? What funding might be available?
- Training – What types of green-blue jobs would be generated? What training would be needed?
- Demand – Is there demand already for this product or service?
- Community – What are the outcomes and benefits for the community?
- Timeline – What could be the timeframe for implementation/to kickstart this project?

Champions were provided the opportunity to select their break-out room and come to a consensus on what potential project they would like to discuss. The three potential projects selected are listed below and the activity discussion for each is documented in Appendix A.

- Full electrification of blighted housing in Richmond
- Senate Bill 1383 surplus food donations
- Upcycling thrift store donations

These are not the only projects that the Champions expressed interest in discussing but are the projects that were collectively selected for this activity.

Defining Green-Blue Jobs in Richmond

Many definitions exist for green jobs but none are specific to the Richmond community's vision and needs. The Champions reviewed the following definitions which were extracted from other sources:

- Bureau of Labor Statistics (BLS) – "Green jobs are either: (A) Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources, or (B) Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources." (2010)
- Organization of Economic Cooperation and Development (OECD) – "Jobs are classified as green if at least 10% of tasks contribute to environmental objectives such as preserving the environment and reducing emissions."
- ILO – "Decent jobs in any economic sector (e.g., agriculture, industry, services, administration) which contribute to preserving, restoring, and enhancing environmental quality."
- United Nations (UN) – "Jobs in sectors that contribute substantially to preserving or restoring environmental quality and minimize waste creation and pollution."

In reviewing these definitions, many Champions resonated most with the United Nations definition and provided additional feedback including:

- Language should be clear and specific to Richmond's environmental goals. These goals should be ambitious, innovative, and bold with a focus on "deep green."
- Words and phrases such as "substantially," "decent jobs," and "jobs in sectors" are too broad.
- Definition should be inclusive of various sectors not just focus on business and industry production activities traditionally associated with green jobs.
- The worker experience including pay and job satisfaction should be clearly articulated.
- It should be emphasized that green jobs will restore economic opportunities in Richmond and will create pathways for training and advancement to provide more equitable outcomes for residents.
- A multi-part definition could be considered to clearly define green-blue jobs and articulate what Richmond needs.

The original notes from this discussion were documented in the notetaking tool Mural and are included in Appendix A.

Project Logo

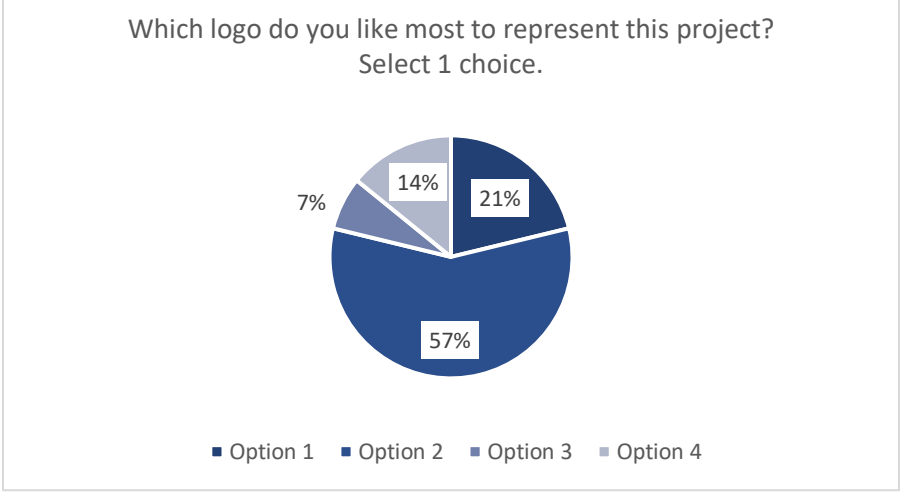
Champions were polled during Meeting #1 to indicate which project logo they felt best represented the Richmond Green-Blue New Deal. Fourteen (14) Champions voted in total and the most support was received for Option 2 (57%).

Option 1:

Option 2:

Option 3:

Option 4:



Community-Based Organization Partners

Partnership Overview

Community-based organizations (CBOs) working in and serving the Richmond community were invited to partner with the Richmond Green-Blue New Deal project by facilitating outreach activities and events between January and mid-March 2023. This approach was used to leverage the existing networks and trusted relationships that CBOs have with the Richmond community, and to reach populations that have been historically excluded from decision-making processes, including community members who are low-income; Black Indigenous or People of Color (BIPOC); or formerly incarcerated. Outreach activities included roadshow presentations, pop-up/tabling events, and social media/email communications to share more about the project, collect community input, and encourage participants to complete the community survey. To thank CBOs for their time and efforts, partners received a stipend of up to $1,000.

The project team compiled a list of CBOs to invite and asked the City of Richmond and Community Champions for additional recommendations. In late November and early December of 2022, CBOs were invited via email to participate in the partnership and were provided with a project description and partnership agreement. The partnership agreement detailed expectations, outreach activity options, and stipend amounts and is available in Appendix B. CBOs were provided the option to schedule an informational meeting with the project team to learn more about the project and help determine whether the partnership opportunity would be a good fit for the CBO. The project team hosted six (6) informational meetings throughout December 2022.

CBO partners were provided with all outreach materials including a roadshow PowerPoint presentation, a project fact sheet, survey social media flyer, editable event flyer, and paper survey in a live folder accessible with a link and password. These materials were also provided in Spanish. An outreach and materials guide was developed to provide partners with guidelines and recommendations for how to use the materials and tips for facilitating outreach activities. Partners were invited to attend an optional CBO Partner Orientation where the project team shared an overview of the project and provided a walkthrough of the outreach materials. Ample time was provided for Q&A and a recording of the orientation was uploaded to the live folder for partners to access later as needed.

Once CBO partners provided their organization's signed W-9 and a signed partnership agreement indicating what outreach activities they planned to facilitate, a check for 50% of the stipend was processed. A second check for 50% of the remaining stipend was processed following completion of all outreach activities and after the CBO submitted a completed Reporting Guide available in Appendix B.

Partners

Seven (7) community-based organizations participated as CBO partners:

- YES Nature to Neighborhoods
- Collaborising
- The Watershed Project
- Rubicon Programs
- Rich City Rides
- Richmond Community Foundation
- CoBiz Richmond

Additionally, the Trust for Public Land and Diana Wear with the Richmond Economic Development Commission facilitated outreach but did not enter into a formal agreement to receive a stipend and therefore did not complete a reporting guide.

Reporting guides were received from six (6) CBO partners.

Findings

CBO partners shared that community members requested updates about the project and wanted to know when they can expect to be engaged again. Community members would also like to see the survey results and findings when they are available.

As captured in the reports received, CBO partners engaged an estimated 2,500 community members through outreach activities and online communications. Community members were engaged in English and Spanish. These outreach activities and online communications include:

- 1 roadshow presentation
- 5 pop-up/tabling events
- 1,143 email opens
- 1,141 social media post views, likes, comments, and reshares

CBO partners engaged other organizations, online communities, and contacts through online communications including Faith in Action East Bay, Black Village Network, Richmond LAND, Councilmember Melvin Willis, SOS Richmond, This is Richmond, Everybody's Richmond, and NextDoor.

Those who participated in the roadshow presentation were asked which green-blue job definitions resonated with them most. These definitions included:

1. Jobs that preserve and enhance the environment for the benefit of current and future generations
2. Jobs that provide meaningful work decarbonizing, retrofitting, upcycling and restoring healthy systems
3. Jobs that center workers and transform the economy from extractive to regenerative systems
4. Jobs centering workers and transforming the economy from extractive to healthy regenerative systems that build a just, equitable, resilient and sustainable future

Definition 4 of green-blue jobs resonated with most participants with the request that "extractive" be clearly defined or conveyed in more simple language.

Participants were also asked which green-blue case studies stood out to them as good opportunities for Richmond. The following case studies received the most votes and are combined with votes from the workshops Safe Return Project hosted:

Projects	Votes
Green accessory dwelling units/additions	17
All electric building retrofits	16
Solar manufacturing	13
Delivering surplus prepared food	13
Battery manufacturing	11
Upcycling thrift store donations	8
Vertical farming	4
Endangered species restoration	4
Redesigned public spaces	3
Upcycling dead or dying trees	3
Building deconstruction	3
Protected bike lanes	1
Wildlife rehabilitation	1
Refillable bottles	1
Restoring shoreline	1
Wind turbine manufacturing	1

Stakeholder Workshops

Purpose

Two stakeholder workshops were facilitated to engage with specific stakeholders whose input is vital in shaping the Green-Blue New Deal plan and who will be important partners in implementing the plan.

Business and Industry Stakeholders

The Council of Business & Industries and the Richmond Chamber of Commerce were engaged to facilitate a workshop for their members. The workshop included an overview of the project with Q&A and a facilitated activity regarding the elements of offshore wind.

Participants included:

- Katrinka Ruk, Council of Business & Industry
- Ryan Lau, AC Transit
- Scott Buckley, Ghirardelli Associates
- Wesley Alexander, CoBiz
- James Lee, Richmond Chamber of Commerce
- Sal Vaca, Friends of the Port
- Cordell Hindler, Park Plaza Neighborhood Council
- Hakim Johnson, Chevron Richmond Refinery

Participants shared priorities and considerations for the plan including:

- Trades training programs should be made available in high schools and community colleges to introduce students to high-road jobs such as automotive work for fuel cell vehicles.
- Training focused on project proposal and bidding is needed for local and disadvantaged contractors to help them be more competitive.
- The plan should include equitable hiring policies and indicate hiring preferences for local Richmond residents and justice-involved candidates.
- Youth perspectives should be highlighted in this plan and in workforce development planning in Richmond. Youth are the future of the workforce.

Union and Trades Stakeholders

The Contra Costa Building & Construction Trades Council was engaged to facilitate a workshop for their members. The workshop included an overview of the project with Q&A, a presentation from Allison Moe with the National Renewable Energy Laboratory (NREL) regarding the Communities LEAP Project, and a discussion about union priorities and concerns.

Participants included:

- EJ Cire, Sheet Metal Workers' Local 104
- Anthony Viscuso, Heat & Frost Insulators Local 16
- Dominic Lucero, Boilermakers Local 549
- Jason Lindsey, Ironworkers Local 378
- Rachel Shoemake, IBEW LU 302
- Felipe Hernandez Rios, UA Local 355

- Rik Drury, Sprinklerfitters Local 483
- Chuck Leonard, Plumbers and Steamfitters Local 342
- Tim Frank, consultant with Contra Costa Building Trades

Participants shared priorities and considerations for the plan including:

- There should be coordination and partnership between the City and unions to ensure Richmond is applying for available grant funding and submitting competitive applications. Participants expressed enthusiasm for supporting efforts to obtain grant funding.
- Training is key to ensuring cost savings and that green improvements are installed and commissioned properly. Union apprenticeship and training programs are the most comprehensive and up-to-date on technological advancements. It is important that these training opportunities are promoted to residents and workers and encouraged as career opportunities to students.
- Labor standards should be attached to funding, for example, regarding the Inflation Reduction Act which rewards contractors with tax credits for meeting labor standards. This helps ensure that regardless of whether the contractor works with unions, local hire and labor standards are being met and workers have received high-quality training.
- Training programs should engage and be inclusive of workers with diverse backgrounds including women, people of color, and formerly incarcerated residents. Participants emphasized that unions are well-positioned to support equity goals in the plan because unions provide training and high-road jobs to people from all walks of life, including people of color, people who are low-income, and people who were formerly incarcerated.
- It is important to consider how sustainable improvements such as electrification can have unintended cost consequences for low-income households. Rebates, tax incentives, and subsidies should be leveraged so a low-income household receiving electrification upgrades does not end up with a higher energy bill.

Participants were asked to complete an exit survey following the workshop. Participants indicated they are most interested in pursuing the following green-blue projects:

- Electrification/decarbonization
    - New and existing construction
    - Transportation
- Alternative energy technologies
    - Offshore wind
    - Solar
    - Hydrogen
    - Carbon capture
    - Geothermal

Survey

Overview

A public survey was developed to gather insights from the community about their vision and goals for the City of Richmond and the Green-Blue New Deal plan. The survey served as an educational tool and collected data from residents and community members to inform key recommendations in the plan and next outreach steps. The survey was not designed or conducted to yield statistically valid results.

Design

The survey included eight (8) questions related to the Green-Blue New Deal plan, 10 demographic questions, six (6) contact information questions for receiving more information, and one (1) question about the Green-Blue New Deal logo. All questions in the survey were optional. The eight (8) questions related to the plan included checkbox questions with a limit of how many options respondents could select and open-ended written response questions. The results for checkbox questions may exceed 100% because respondents were allowed to choose multiple options. The six (6) contact information questions will be submitted to Appraccel and the City of Richmond separately so these community members can stay engaged as development and implementation of the plan moves forward.

The survey was available in English and Spanish. A full version of the survey was available online using the survey platform Alchemer and a condensed version of the survey was available as a double-sided one-page paper survey. Both survey versions are available in Appendix C. Paper surveys helped ensure that community members who may not be connected to the City virtually were still provided with the opportunity to share their input. Paper surveys were also used by partners to survey community members during outreach activities including workshops and tabling events.

During survey question development, the survey underwent review and edits by City staff. In this process, the focus of some survey questions expanded beyond the scope of the Green Blue New Deal project. For this community findings report, we focus on the survey questions and responses that are directly relevant to the GBND. The responses to questions that were expanded emphasize respondents' concerns regarding meeting immediate basic needs such as food, housing, health care and mental health and a desire to expand the community safety net.

The survey was drafted to use plain language. During revisions, some language was changed to more closely align with wording in the City Resolution and Climate Action Plan. Some stakeholders provided feedback that the survey language was not accessible to all community members and recommended that it be written at or below an 8th grade reading level.

Promotion

The survey was promoted by several supporters of the plan, including Community Champions, CBO partners, and Groundwork Richmond, a local CBO and sub-consultant on the project. Groundwork Richmond committed to collecting 100 surveys at their events during the community outreach period. A link to the survey was also promoted in the City Manager's Weekly Report a few times.

Response Statistics

The survey was open from January 10, 2023 through March 20, 2023. Community Champions were invited to complete the survey and share their feedback on the user experience during December 2022, before the survey formally opened in January 2023. The goal stated in the Engagement Plan was to collect

at least 100 survey responses. In total, 431 responses were received to the survey. These responses can further be broken down into:

- Response Type
    - Complete: 405 (94%)
    - Partial: 26 (6%)
- Response Form
    - Online: 320 (74%)
    - Paper: 111 (26%)
- Response Language
    - English: 387 (89.8%)
    - Spanish: 44 (10.2%)

It is important to note that most Spanish surveys were received in paper form as they were gathered during outreach efforts along Richmond's 23rd Street commercial district.

Findings

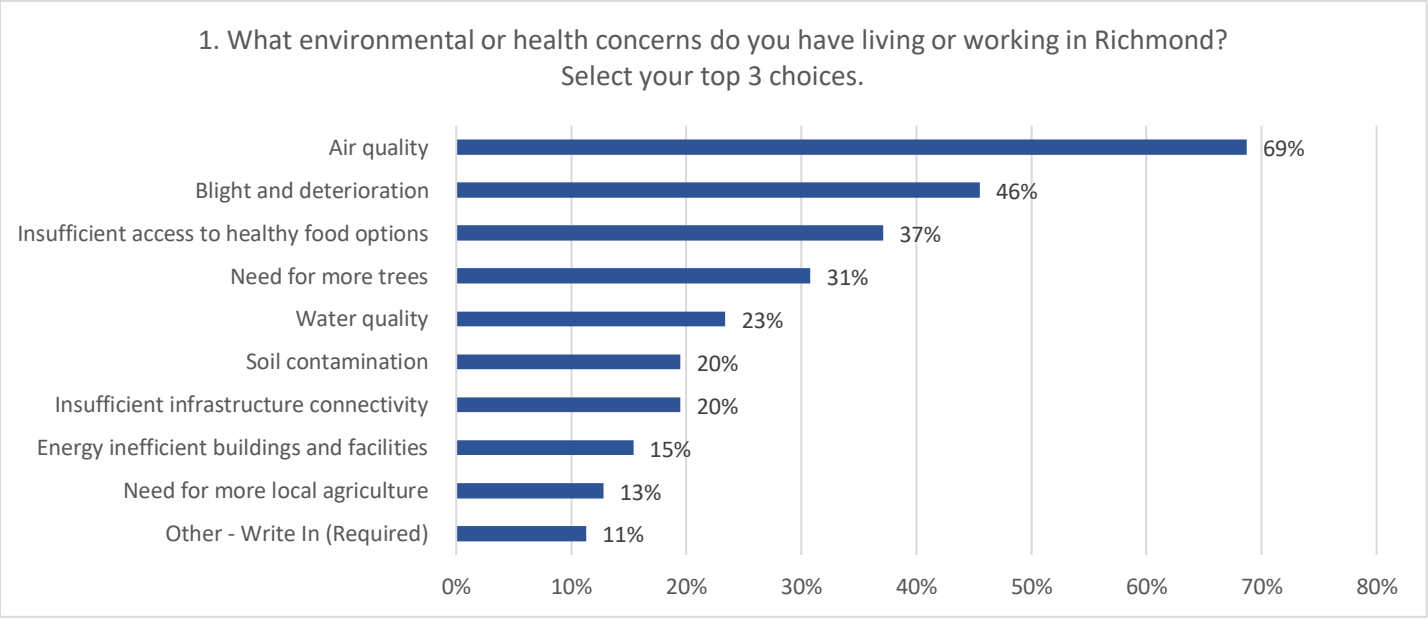
This section includes high-level findings from each survey question. The raw survey data is available in **Appendix D**. These findings reflect the perspectives, priorities, and concerns of those who completed the survey and should be considered as community insights rather than representative of all Richmond residents. As noted in the report, several questions were expanded beyond the focus of the Green-Blue New Deal and provide insight into the broader interests and concerns of Richmond residents.

1. What environmental or health concerns do you have living or working in Richmond? Select your top 3 choices.

Respondents identified air quality (69%) as their top environmental and health concern living and working in Richmond. This concern was followed by blight and deterioration (46%), insufficient access to healthy food options (37%), and need for more trees (31%).

A disaggregated analysis of responses by race shows broad overlap in responses. Respondents were grouped into two groups: 1) white alone, and 2) races other than white or multi-racial. Further disaggregation was not possible due to the small sample size. Both groups identified air quality as a top concern, with more than 60% of respondents in both groups selecting this option. Respondents who identified as white alone were more likely to identify blight and deterioration as a problem (53%) than were respondents of other races or who were multiracial (39%).

Total Responses: 415/431



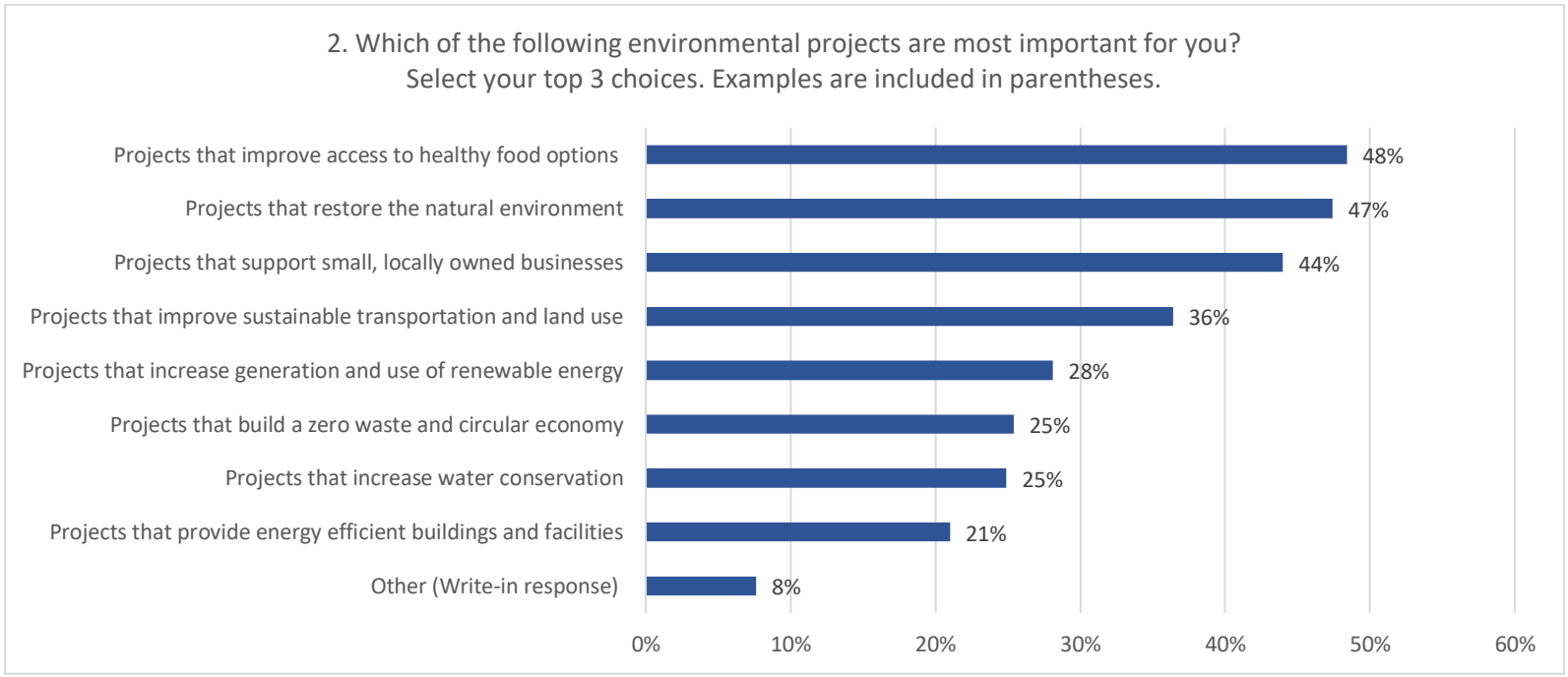
2. Which of the following environmental projects are most important for you? Select your top 3 choices.

Respondents indicated that projects that improve access to healthy food options (48%), projects that restore the natural environment (47%), and projects that support small, locally owned businesses (44%) are the types of environmental projects which are most important to them.

A disaggregated analysis of responses by race shows broad overlap in responses. Respondents were placed into two groups: 1) white alone, and 2) races other than white or multi-racial. Further disaggregation was not possible due to the small samle size. Responses reflected similar choices in both the white alone group and the races other than white and multiracial group (less than a 10% difference). The two responses with greater than a 10% difference were improving access to healthy food choices (37% white alone, 51% races other than white and multi-racial), and increasing access to and use of renewable energy (35% and 23% respectively).

In the survey, examples were included in parentheses with each of these statements to provide more context but have been removed for ease of depicting the data in the chart below.

Total Responses: 409/431



3. Which of the following implementation objectives should this effort prioritize? Select your top 3 choices.

Respondents indicated that this effort should prioritize access to health care and mental health services (47%), local job opportunities that build wealth and provide family-sustaining wages for workers (42%), and improve the affordability of housing and reduce operating expenses (39%). Access to health care and mental health services is an important area of concern for respondents, which, while not an area directly targeted by the Green-Blue New Deal, provides insight for local policy makers on constituents' needs.

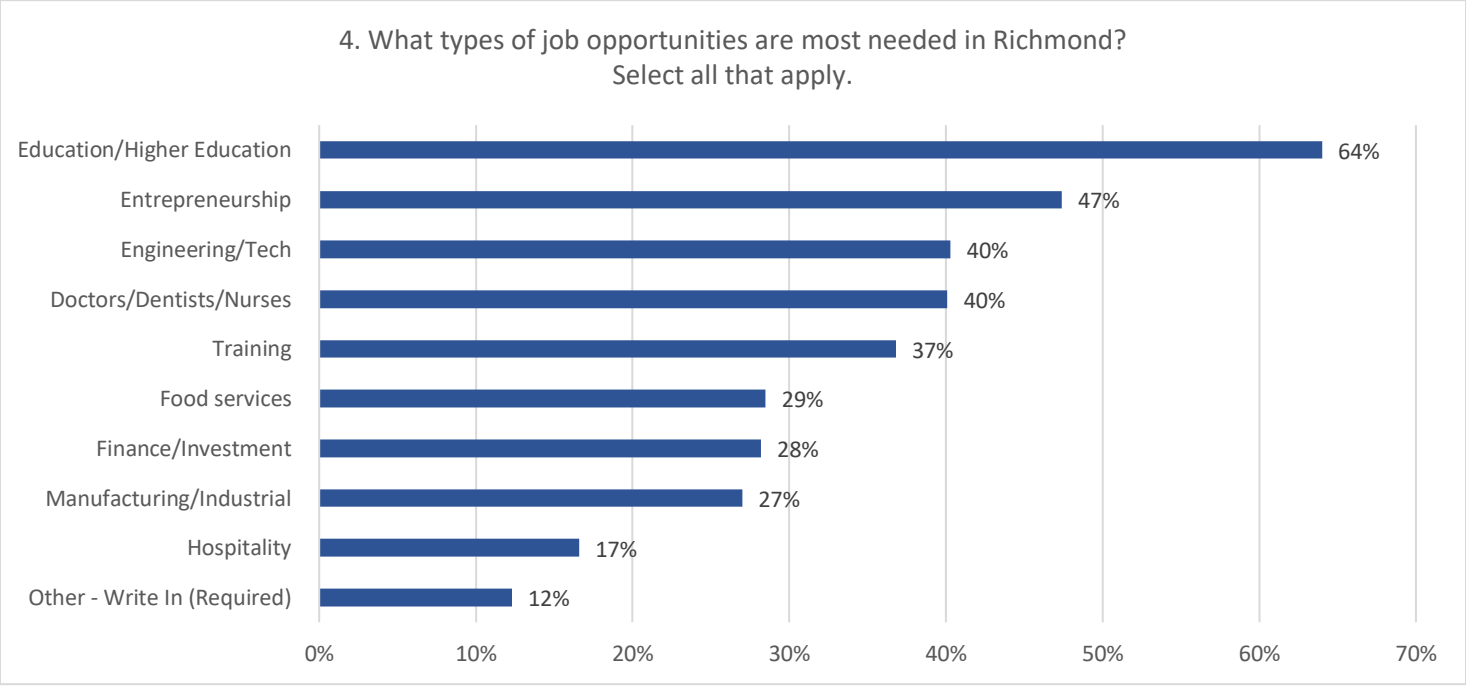
Total Responses: 404/431

4. What types of job opportunities are most needed in Richmond? Select all that apply.

Respondents indicated that education and higher education job opportunities (64%) are most needed in Richmond. This was followed by job opportunities in entrepreneurship (47%), engineering/tech (40%), doctors/dentists/nurses (40%), and training (37%).

For respondents who included "Other" as a response, several indicated that trades and union jobs with paid training and apprenticeship are most needed in Richmond.

Total Responses: 397/431



5. Are there any particular green jobs topics or projects you would like to learn more about?

Participants were most interested in learning more about:

- Renewable energy sources including solar energy and wind energy
- Restoring the natural environment and cleaning up contaminated land
- Training opportunities for youth, students, and those with less work experience

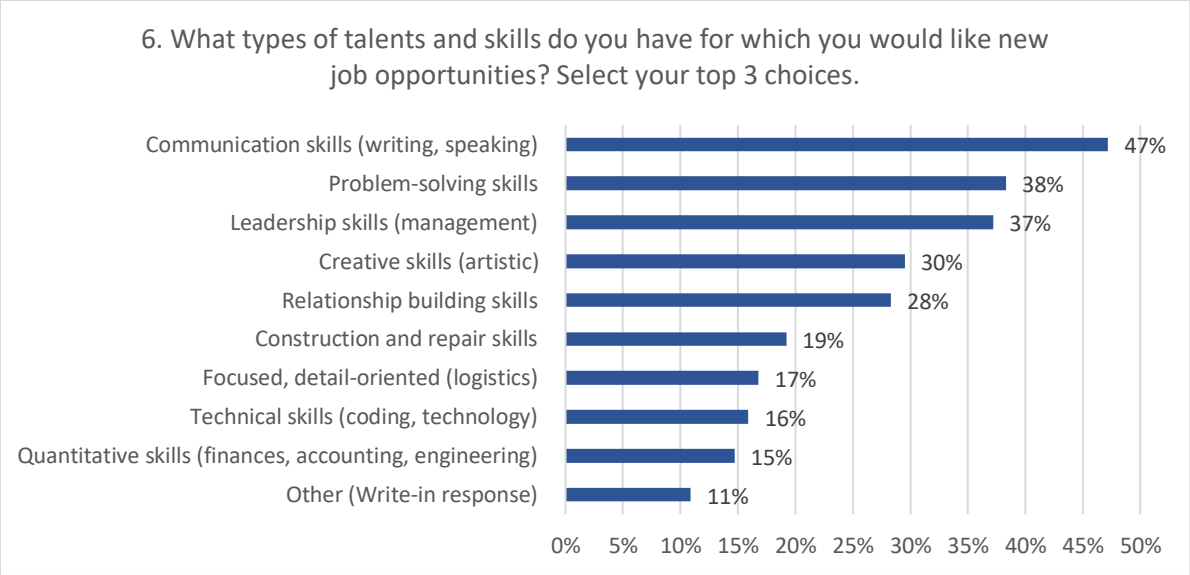
Total Responses: 86/431

*Question 5 was not included in the paper survey.

6. What types of talents and skills do you have for which you would like new job opportunities? Select your top 3 choices.

Respondents indicated that they are most interested in new job opportunities that require communication skills (47%). This was followed by problem-solving skills (38%), leadership/management skills (37%), creative/artistic skills (30%), and relationship building skills (28%). The top talents and skills indicate there is a strong interest in job opportunities requiring soft skills.

Total Responses: 339/431



7. What does a Green-Blue Richmond in 2030 look like to you? How do you envision a Green-Blue Richmond in 2030?

Participants' visions for a Green-Blue Richmond in 2030 included:

- A healthy and clean community where residents feel safe and take pride in Richmond
- A local economy that has transitioned to environmentally sustainable industries and jobs
- More local jobs with higher wages for Richmond residents that have accessible training opportunities
- Support for existing and new small businesses and entrepreneurs
- More affordable housing and housing solutions for all, including unhoused residents
- Thoughtfully planned, reliable, and accessible public transportation
- Nature restoration and more green space and parks for community to gather
- Access to healthy, fresh food options and elimination of food deserts

Total Responses: 160/431

*Question 7 was not included in the paper survey.

8. What questions or concerns should be considered 1) during the development of the Plan and 2) during the implementation of the Richmond Green-Blue New Deal Workforce Development Plan?

Participant questions and concerns about the Green-Blue New Deal development and implementation of the plan included:

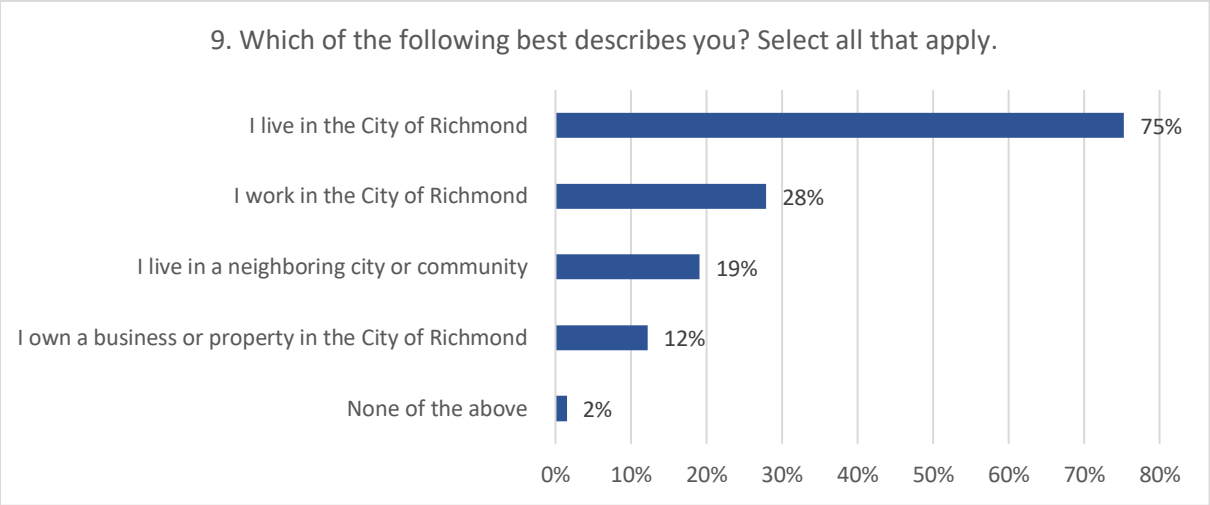
- How will the Green-Blue New Deal benefit Richmond residents that need the most support? These communities include historically underserved and underinvested communities, BIPOC communities, formerly incarcerated community, and unhoused community.
- Ensuring sustainable, long-term benefits for Richmond residents including health, employment, and housing stability.
- Implementation logistics
    - Who will implement the workforce development plan and what are their qualifications?
    - Where is funding for the plan coming from?
    - Who will make funding decisions related to the plan?
    - Are decisions data-driven and evidence-based?
    - How will updates and progress be communicated to the community?
    - What outcomes and metrics are being used to measure impact?
    - How do these outcomes and metrics prioritize the environment and local workers?
- The community would like to continue to be updated on progress during implementation and be able to provide input that will be incorporated on an ongoing basis. It is important to engage with community members through strategies and networks beyond standard City communications that allow for robust discussion and engagement.
- The plan should be inclusive of all Richmond residents and ensure all voices are heard.
- Understanding and acting to mitigate the potential for gentrification and displacement resulting from green-blue economic development.

Total Responses: 187/431

9. Which of the following best describes you? Select all that apply.

Most respondents live in Richmond (75%) and nearly a third work in Richmond (28%).

Total Responses: 409/431

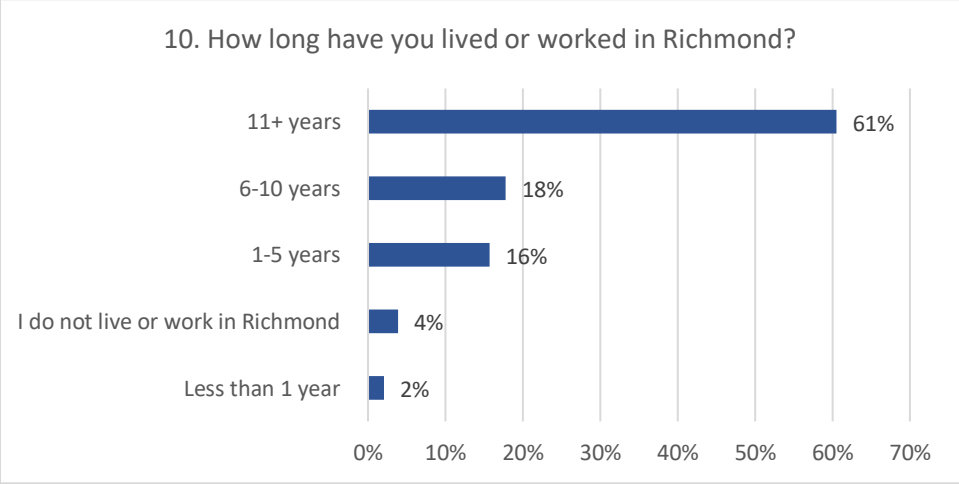


10. How long have you lived or worked in Richmond?

Most respondents have lived or worked in Richmond for 11 years or more (61%) trailed by 6-10 years (18%) and 1-5 years (16%), indicating that most respondents reached are long-term Richmond residents.

Total Responses: 281/431

*Question 10 was not included in the paper survey.



11. What neighborhood do you live in? What are the landmarks or streets that define your neighborhood?
The most common neighborhoods respondents live in included:

- North and East (22)
- East Richmond (19)
- Marina Bay (13)
- Hilltop (10)
- Point Richmond (10)
- Panhandle Annex (10)
- Richmond Annex (9)
- Brickyard Cove/Landing (8)
- Iron Triangle (8)
- El Sobrante (7)
- May Valley (6)

The other responses included specific landmarks or cross streets.

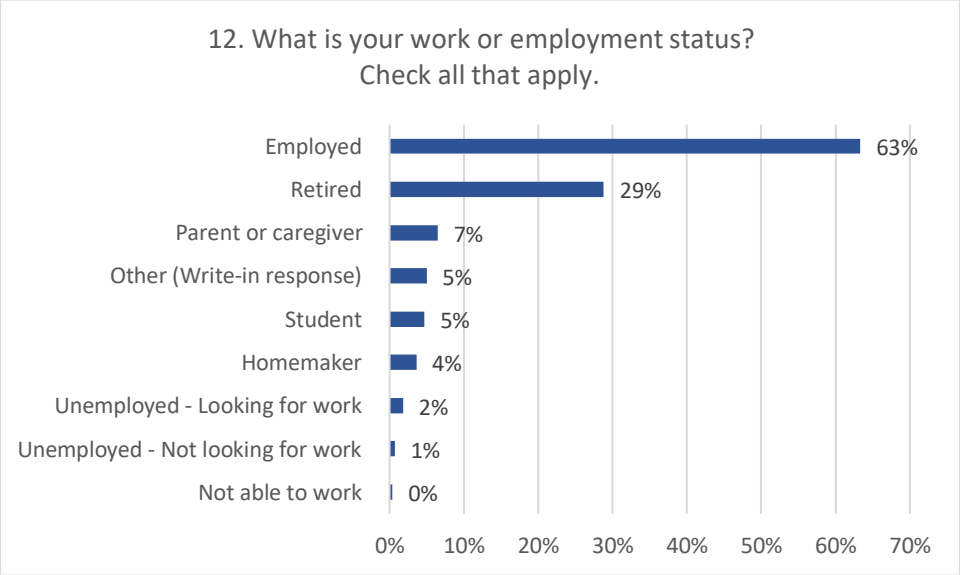
Total Responses: 230/431

*Question 11 was not included in the paper survey.

12. What is your work or employment status? Check all that apply.
Respondents who selected "Other" indicated they were employed part-time or self-employed.

Total Responses: 278/431

*Question 12 was not included in the paper survey.

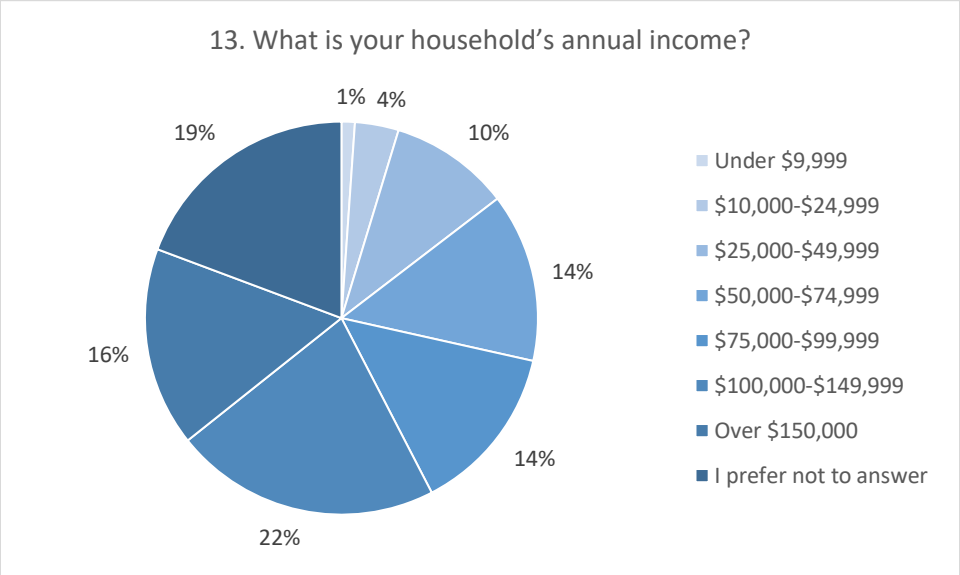


13. What is your household's annual income?

Respondents reported a variety of income levels with the top responses being $100,000-$149,000 (22%). A significant number of respondents preferred not to answer (19%).

Total Responses: 274/431

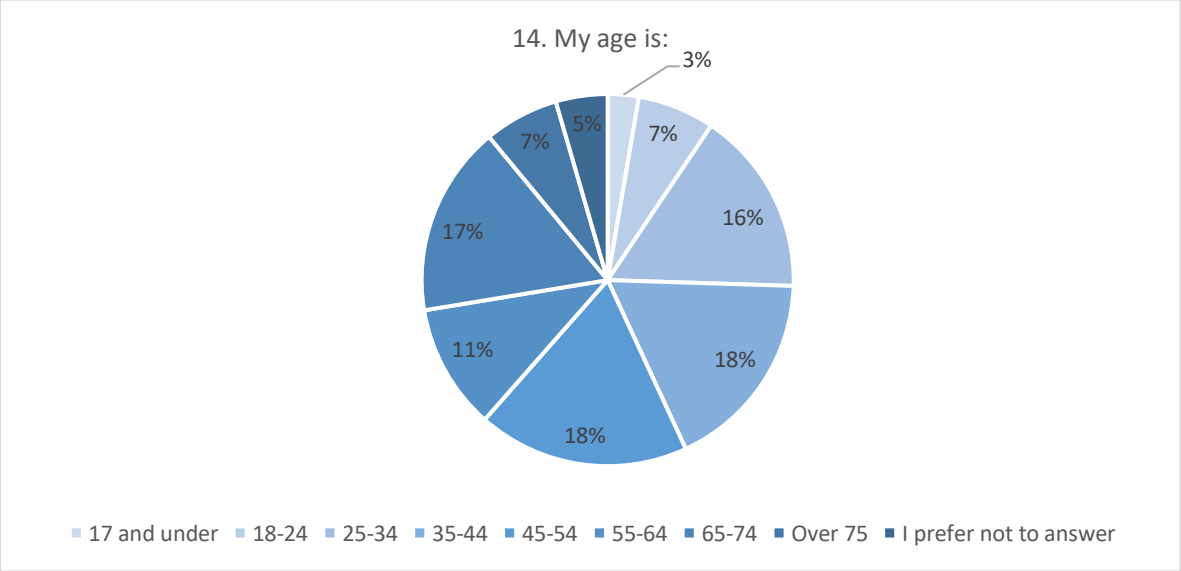
*Question 13 was not included in the paper survey.



14. My age is:

Respondents reported a variety of ages with a nearly even response rate between 25-34 (16%), 35-44 (18%), 45-54 (18%), and 65-74 (17%).

Total Responses: 403/431

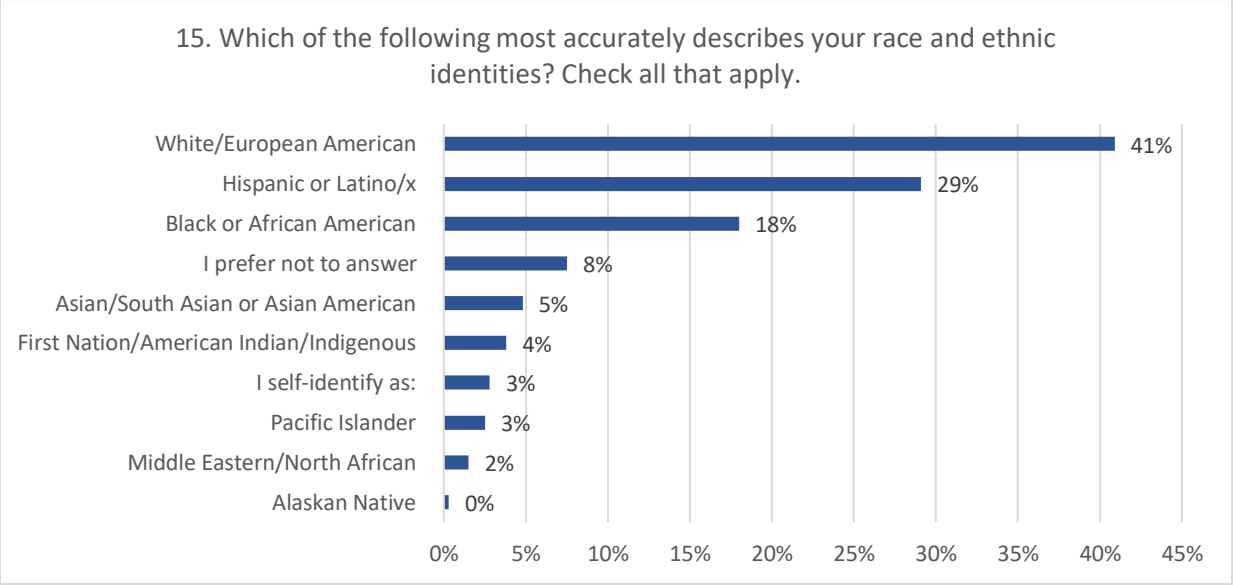


15. Which of the following most accurately describes your race and ethnic identities? Check all that apply.

Respondents reported a variety of race and ethnic identities. White and European respondents (41%) followed by Hispanic or Latino/x respondents (29%), and Black or African American respondents (18%). With the exception of the Hispanic or Latino/x respondents, respondent race and ethnic identities are within 10% of the racial demographics reported by the U.S. Census Bureau.[2]

The "I self-identify as" option was a written response option for respondents interested in identifying their race or ethnicity.

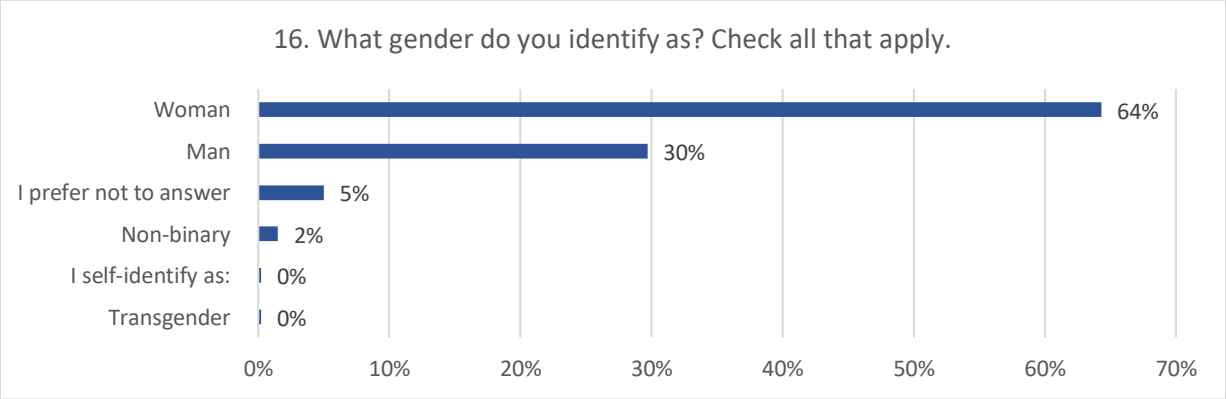
Total Responses: 399/431



16. What gender do you identify as? Check all that apply.

Most respondents identified as women (64%).

Total Responses: 401/431

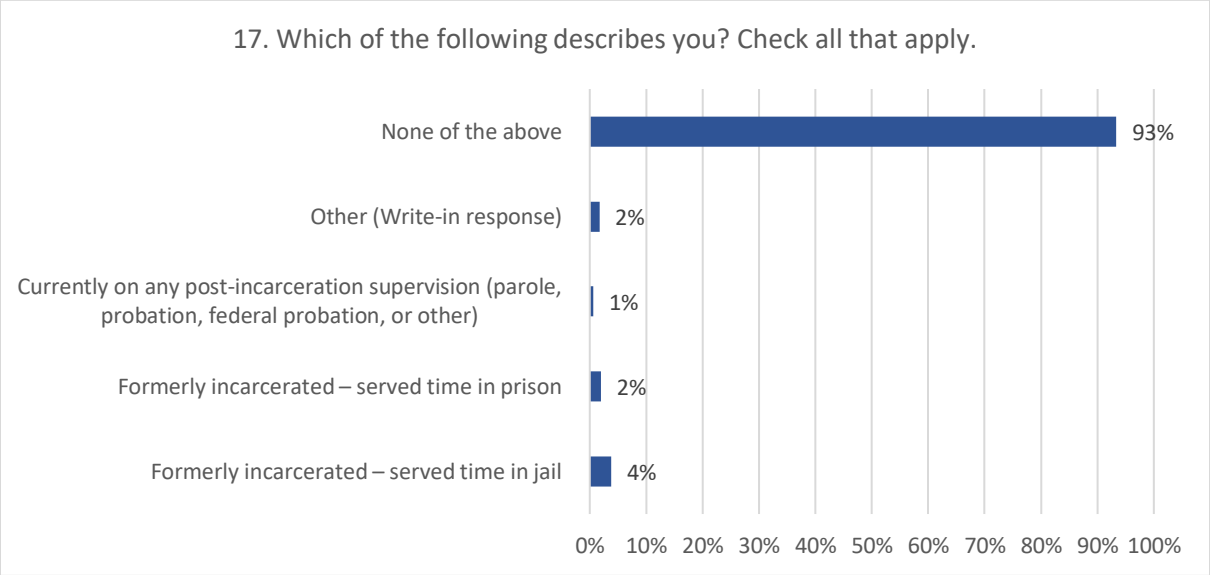


[2] www.census.gov/quickfacts/richmondcitycalifornia

17. Which of the following describes you? Check all that apply.

Six percent of respondents indicated they were formerly incarcerated with 4% serving time in jail and 2% serving time in prison. Respondents who selected "Other" indicated they had family members (parents or children) who have been systems impacted or they had been arrested with charges dropped.

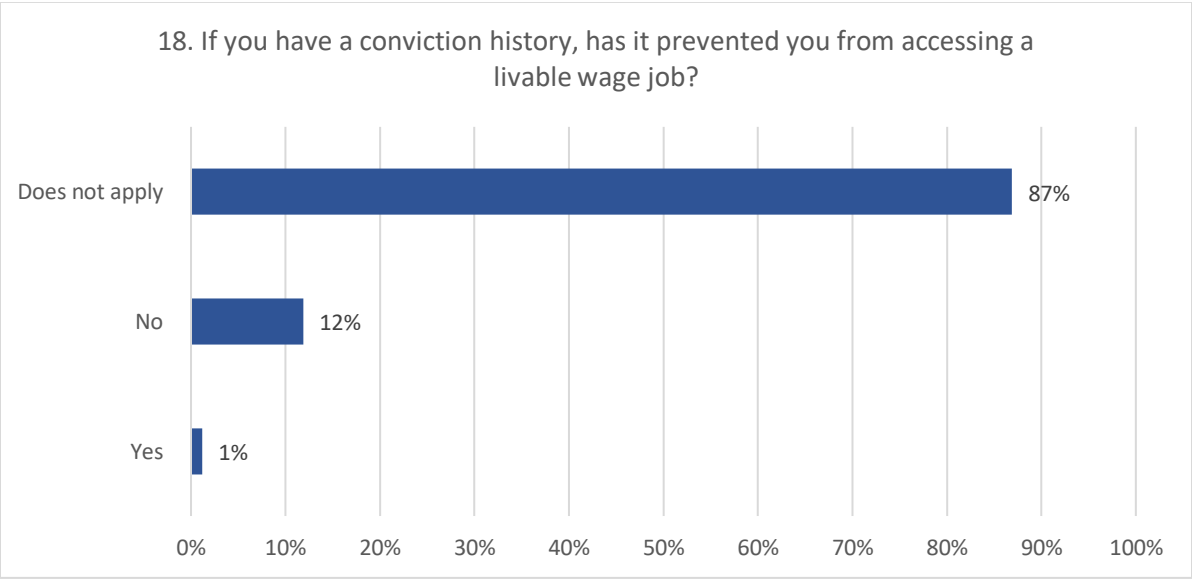
Total Responses: 345/431



18. If you have a conviction history, has it prevented you from accessing a livable wage job?

Thirteen percent of respondents indicated that this question applied to them and of that percentage 12% (29 respondents) indicated their conviction history has not prevented them from accessing a livable wage job and 1% (3 respondents) indicated it has prevented them from accessing a livable wage job.

Total Responses: 244/431



25. All aspects of the Richmond Green-Blue New Deal will represent the vision of the community. Which logo do you like most to represent this project? Select 1 choice.

The majority of respondents indicated support for logo option 2 (31%) and logo option 4 (32%). Together, option 2 and option 4 garnered 63% of votes.

Option 1:

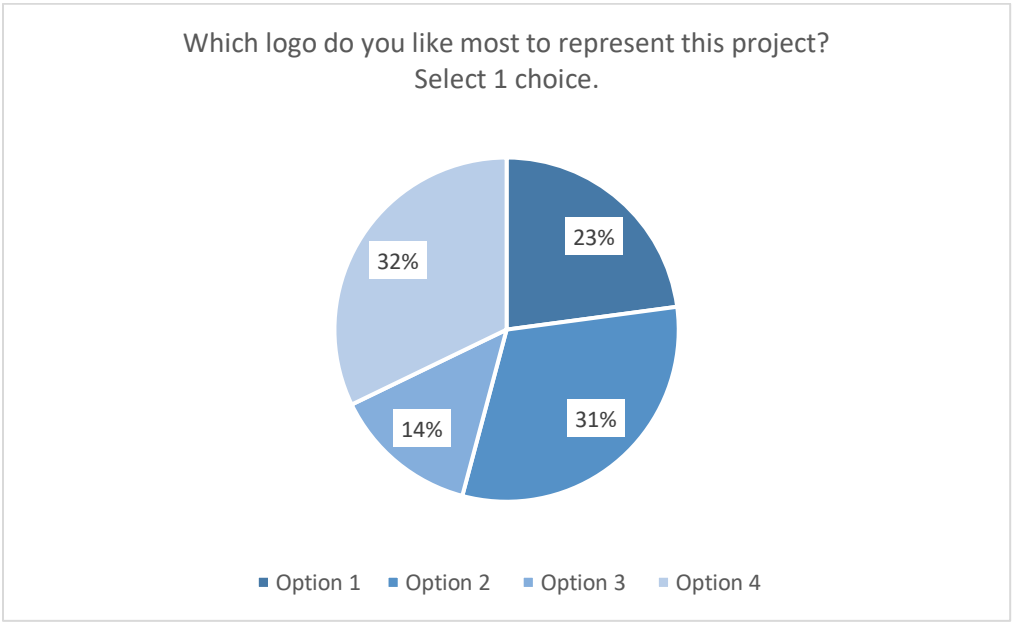
Option 2:

Option 3:

Option 4:

Total Responses: 227/431

*Question 25 was not included in the paper survey.



Appendix

- Appendix A- Community Champions Meeting Activities
- Appendix B- CBO Partner Materials and Documents
- Appendix C- Online and Paper Surveys
- Appendix D- Survey response data (Excel sheet)

Insights About the Future Green-Blue Economy from Justice-Involved Richmond Residents

Submitted to the City of Richmond City Manager's Office

May 18, 2023

Prepared by:

SAFE RETURN PROJECT

Appraccel

Richmond Green-Blue New Deal Workforce Development Plan
https://www.ci.richmond.ca.us/4138/Green-Blue-New-Deal-and-Just-Transition

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Insights About the Future Green-Blue Economy

from Justice-Involved Richmond Residents

Executive Summary

In a competitive labor market, we cannot afford to exclude people who are willing and able to work. Many formerly incarcerated individuals who have served their debt to society would like to work to support themselves and their families. Local non-profits like Safe Return Project understand the challenges they face as they seek to secure employment.

At the same time, the work of designing and building a just, equitable, resilient, and sustainable future needs people. Transforming our energy systems, buildings, transportation systems, materials economy, and food system as well as restoring nature and redeveloping brownfields will require a variety of skills and talents.

Anticipating these current and upcoming projects, Safe Return Project led three workshops with thirty (30) justice-involved individuals in fall 2022 to understand the skills they offer, their interests, the challenges they face, and gather their insights about the future green-blue economy. Facilitators heard about participants' skills in management, entrepreneurship, administration, communications, construction, and the arts. Attendees shared information about their interests in projects such as all-electric building retrofits, rescuing surplus prepared food, solar panel manufacturing, battery manufacturing, and upcycling thrift store donations. The findings in this report shine a spotlight on the resources needed to help justice-involved individuals reintegrate into the economy and reduce the number of people caught in the cycle of recidivism and reincarceration.

Introduction

Building the green-blue economy of the future will require battalions of new workers. With California's low unemployment rate, 4.4% in March 2023, we cannot afford to pass over anyone who is ready and willing to work.

Annually, about 35,000 people are released from the state's prisons and of the 350,000 people booked into jails each year, most are released within a few months.[1] They face numerous barriers to reintegrate into society and the work world: fulfilling court obligations; satisfying probation/parole officer meetings; opening a bank account; applying for social services; securing housing; finding transportation; obtaining a driver's license with the Department of Motor Vehicles; passing a General Educational Development (GED) test; obtaining services for physical and mental health; and finding and keeping employment. Even obtaining Social Security cards, birth certificates, and training and education certifications—all of which are vital building blocks to stabilization— often prove difficult. Fortunately, there are non-profit organizations working on their behalf.

[1] California Health Care Foundation. "From Corrections to Community: Reentry Health Care." July 1, 2022, https://www.chcf.org/project/corrections-community-reentry-health-care, Date of Access May 18, 2023.

What is Safe Return?

Safe Return Project lifts up those who have been negatively impacted by criminalization and inequity. With the goal of developing the capacity for the formerly incarcerated to take the lead on issues that impact them, Safe Return instills a sense of agency. Since its inception, Safe Return has focused on hiring formerly incarcerated people to engage in participatory action research, community organizing, and policy advocacy on issues impacting individuals returning from jail and prison.

People with past convictions who have served their sentences face 4,800 restrictions on participating fully in society.[2] These collateral consequences are imposed long after completion of a sentence, reinforcing the idea that individuals with past convictions have forfeited their rights to equity, equal opportunity, and full citizenship.

Safe Return Project plays a key role in the community by advocating for policy changes that will ensure that people who have been criminalized do not face roadblocks to employment and success.

Some of the barriers and challenges the justice-involved community faces are internal. Safe Return Project's peer support environment holds space for people processing the aftermath of incarceration and helps navigate shared challenges. The non-profit understands how to hold this community with compassion and care in a culturally competent way that helps them move forward.

Workshop #1 – Sept. 26, 2022

Since Safe Return Project prioritizes the internal hiring of formerly incarcerated and systems-impacted individuals, the non-profit serves as a model for employment. When staff hear of vacancies outside of the organization, they reach into their network of partners to find qualified candidates. This is how Safe Return Project has become a pipeline of talent and grown the number of formerly incarcerated workers with strong skill sets in supervisory roles, office management, communications, organizational development and more.

Looking externally, Safe Return Project also provides consulting services to employers who see the value of second chance hiring. The set of challenges facing justice-involved individuals can be great but the rewards to employers more than make up for the challenges. Safe Return Project serves as a partner and consultant to help second chance employers support the success of their employees in the workplace.

[2] Californians for Safety and Justice. "Repairing the Road to Redemption in California." September 2018, https://safeandjust.org/interactivereport/repairing-the-road-to-redemption-in-california, accessed May 12, 2023.

Workshop Goal

The goal of Safe Return Project's portion of the Richmond Green-Blue New Deal project was to conduct workshops with a network of formerly incarcerated and convicted individuals and their families to better understand the community's potential interest in green-blue jobs, their skill sets, and resources needed. Information gathered will guide the development of the three main reports for the Richmond Green-Blue New Deal: the Green-Blue New Deal Opportunities Report, Implementation Plan, and the Community Toolkit.

Methodology

To encourage participation in one of the three workshops, in fall 2022, Safe Return Project staff spent eight weeks conducting outreach within their network of formerly incarcerated and convicted individuals and their families. The project goal of engaging with and learning from 30 attendees was fulfilled:

- 11 attendees at workshop #1 on Sept. 26, 2022
- 13 attendees at workshop #2 on Oct. 3, 2022
- 6 attendees at workshop #3 on Oct. 10, 2022

These 2½ hour workshops introduced the federal Green New Deal, shared several case studies, polled the level of interest in 15 green-blue job projects, and led a discussion about economic opportunities, upward mobility, skills, needs, and challenges. Evaluations were completed after each workshop by soliciting feedback on content and desired engagement in the project moving forward. Each of the 30 attendees received a $50 gift card for their time.

Workshop #2 – Oct. 3, 2022

Findings

Participants generously shared their stories and insights. Besides learning about attendees' skill sets and green-blue job preferences, workshop facilitators also heard about what participants consider a "good job" and a "living wage," and the support they need to reintegrate into the working world.

Skills

When asked about their skill sets, the top 10 skills or trades participants identified over the course of the three workshops included:

1. Management
2. Entrepreneurial
3. Electrical
4. Carpentry

5. Painting
6. Hospitality
7. Research
8. Customer service
9. Artistic
10. Healing

All 10 of these skills or trades would be useful in some capacity for the green-blue projects that were described in the workshop. The more detailed list of skills or trades attendees identified included:

1. Driving
2. Teaching/educating
3. Marketing
4. Entrepreneurial
5. Healing
6. Cooking /cooking instructor
7. Cosmetology
8. Patience
9. Facility maintenance
10. Electrical
11. Carpentry
12. Creation of beauty products
13. Health worker
14. Mental health services
15. Yoga, Zumba, body work instructor
16. Communications
17. Active listening
18. Fast learner
19. Home improvement
20. Caregiving
21. Networking
22. Horticulture
23. Problem solving
24. Motivational speaking
25. Mentoring
26. Gardening
27. Critical thinking skills
28. Community advocacy
29. Community engagement
30. Jewelry making
31. Writing and editing
32. Fundraising
33. Accounting
34. Hospitality
35. E-commerce
36. Crafting

Workshop #3 – Oct. 10, 2022

37. Fitness and nutrition
38. Organizing
39. Conservation
40. Frontline work
41. Coordination
42. Motivation
43. Leadership
44. Self-discipline
45. Research
46. Empathy
47. Creative thinking
48. Managing people

This wide variety of skills and trades could be applied to future work building a just, equitable, resilient, and sustainable future.

Preferred Green-Blue Projects

To understand which green-blue jobs projects participants were most interested in, workshop facilitators presented an overview of the following 15 projects.

1. Battery manufacturing
2. Solar panel manufacturing
3. Wind turbine manufacturing
4. All-electric building retrofits
5. Green accessory dwelling units construction
6. Building deconstruction
7. Redesigning public spaces
8. Protected bike lanes
9. Upcycling dead and diseased trees
10. Upcycling thrift store donations
11. Refillable bottles
12. Vertical farming
13. Rescuing surplus prepared food
14. Shoreline restoration
15. Wildlife restoration

Participants were asked to vote for their top three areas of interest. The following five projects received 10 or more votes.

- All-electric building retrofits (21)
- Rescuing surplus prepared food (19)
- Solar panel manufacturing (13)
- Battery manufacturing (10)
- Upcycling thrift store donations (10)

When asked what skills employers were looking for in the current job market, participants highlighted:

- Construction
- Administration
- Hospitality

Participants shared the qualities they believe employers are looking for: reliability, honesty, sociability, and professional people with good attitudes toward training. While most workshop attendees were curious about which green-blue employers were hiring, a few members of each group expressed their entrepreneurial spirit and professed to wanting to start their own business.

Defining a good job and a living wage

When asked to describe a "good job," participants stated that good jobs shouldn't be stressful, should provide a living wage, come with benefits like retirement and quality healthcare, and offer opportunities for advancement. Across all three workshops, participants expressed that they felt good jobs should be available in the communities where they live.

These workshops helped us learn what the term "living wage" meant to participants and how earning a living wage would affect them. A living wage means "being able to pay bills and have something leftover." This would allow them "to live their lives the way they want instead of paycheck-to-paycheck."

Participants felt that a living wage meant making enough to cover their current costs of living. Earning more would afford them financial security to stop worrying about getting old; reduce stress about bills; care for their families; and give back to their communities.

One person specifically stated that they thought a living wage would be greater than $25/hour. The general sentiment was that securing employment with a living wage post-incarceration clearly would be life changing but that they face many barriers before they can secure stable employment.

Reintegration challenges

During the workshops, several different challenges to reintegration were identified including housing, transportation, conviction history, lack of resources, and family reunification. Specifically, participants could be facing challenges such as:

- court obligations,
- probation/parole officer meetings,
- securing a driver's license
- opening a bank account,
- applying for social services,
- housing/landlords,
- securing reliable transportation,
- completing a GED,
- securing documentation needed to apply for a job,
- identifying services for physical and mental health, and

- finding and keeping employment.

Support to navigate these obstacles would help justice-involved individuals succeed.

Employer concerns about hiring justice-involved individuals

Workshop attendees shared that in addition to the challenges listed above, they also face employers' opinions and fears. These often-unspoken concerns can block individuals from joining the workforce, regardless of their qualifications. Furthermore, insurance liabilities and background checks can exclude individuals from jobs that match their skills and experience.

In light of these factors, workshop facilitators asked participants why they think employers are afraid to hire them and what they can do to de-stigmatize employers' minds. Participants believe that employers are misinformed and base many of their decisions on stereotypes that paint formerly convicted individuals as dangerous, untrustworthy, a threat to society, and not worth the risk.

Despite these challenges, participants felt that they could change minds and practices by:

- showcasing their skills and positive attributes,
- showing hiring managers studies and data explaining justice-involved individuals are more of a perceived liability than an actual risk,
- educating them on the excessive economic impacts of having a conviction, and
- eliminating background checks for most professions.

Support requested

During each of the workshops, participants identified the types of support that would help them prepare to enter the job market, ranging from opportunities to further their education, more skilled labor training in schools, jails, and prisons, as well as access to technology, reliable transportation, and soft skill development.

When asked what kind of assistance was needed for participants to overcome these challenges, 16 sources of support were identified. Participants stated that job training, pre- and post-release job placement programs, policies that reduce barriers to housing and jobs, trauma-informed services, and community support would be helpful.

Recommendations

As a result of information collected at the Safe Return Project workshops, organizers offer a set of recommendations for integrating justice-involved people into the green-blue economy. To support justice-involved individuals, the following would be valuable:

- Job training - pre-release
- Paid job training – post-release
- Work readiness support
- Trauma-informed services

- Creation of job centers
- Post-incarceration job placement assistance
- Employment education fairs
- Green-blue jobs notification system
- Re-entry retention services

For aspiring entrepreneurs:

- Cohorts of entrepreneurs to support each other while developing business plans, identifying funding, and working on other aspects of launching a business

For employers:

- Training that guides recruitment and screening conversations with formerly incarcerated individuals who have hard and soft skills that match employers' hiring needs. (See the Fair Chance Corporate Cohort case study in the sidebar.)

For government:

- Create a Fair Chance Advisory Committee

Fair Chance Corporate Cohort Training

Jobs for the Future hosts the Fair Chance Corporate Cohort which was designed for Human Resource and Operations professionals within companies looking to build inclusive, competitive, and thriving workplaces. The cohort model guides a small group of companies through a several week training and coaching process that prepares participants to actively embrace and adopt a Fair Chance Employment program. Participants learn how to assess their company's current state of employment practices, debunk common myths about fair chance employment and create a customized implementation plan for their companies.

The group gathers virtually to participate in lessons with experts in employment law, Human Resources, change management, those with lived experience and more.

Evaluation comments

At the end of each workshop, attendees filled out an evaluation form. A sample of the overwhelmingly positive comments received include:

- "Overall, it was very informative and provided a lot of info that will be positive for the future."
- "I'm an introvert. These ladies made it easy to speak out and engage. Thank you."
- "Finally found an organization that cares about the community I want to be a part of."
- "Very informative, super kind and know their topics."
- "Hearing how important a Green New Deal is and the numerous types of jobs available."
- "Amazing, inspiring, exciting conversation."
- "Everything was presented clearly."
- "I felt a really good vibe. I didn't feel shy."

Conclusion

To reduce the number of people stuck in the cycle of recidivism and reincarceration, jobs are the offramp from the justice system. Given the workshop participants' interest in the Green New Deal, green-blue jobs could provide them with not just a way to support themselves but also work that is meaningful to them.

Thirty workshop participants shared information about their skill and talents, preferences, the barriers they face, and the resources they need to reintegrate into society. The green-blue projects that

intrigued attendees most included building electrification, manufacturing of batteries and solar panels, rescuing surplus prepared food, and freshening up donated thrift store clothing, furniture, and housewares into valuable new items.

Workshop facilitators appreciated attendees sharing their stories and insights. Information gleaned during the three workshops will inform the Richmond Green-Blue New Deal Opportunities Report recommendations.

Richmond Green-Blue New Deal Workforce Development Plan

Community Profile & Economic Development Insights

January 2023

Appraccel
Appreciative Acceleration

HR&A

CITY OF Richmond CALIFORNIA

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EXECUTIVE SUMMARY & ANALYIS HIGHLIGHTS

HR&A Advisors is a national consulting firm providing services in inclusive growth, urban tech and innovation, program design and implementation, and place-based initiatives.

HR&A is supporting the Appraccel team by profiling Richmond's green-blue economy.

The Community Profile addresses the following key questions:

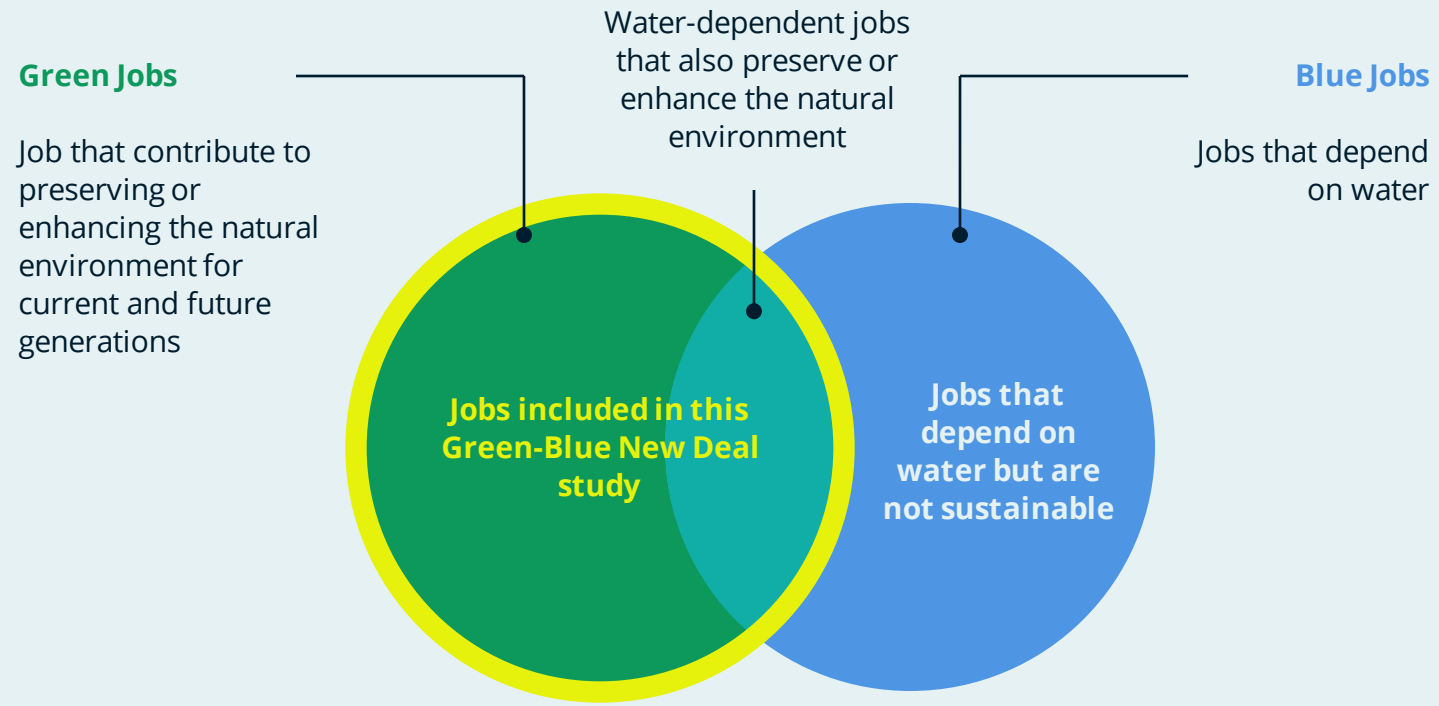
1. Which of Richmond's economic strengths are most relevant to the creation of Green Jobs?
2. How many Green Jobs are in Richmond today?
3. Which occupations and industries in Richmond have the most Green Jobs?
4. What are the demographics and wages of workers in Richmond Green Jobs?
5. How does Richmond's green economy compare to that of the county and metro area?

A green job is one that contributes to preserving or enhancing the natural environment for current and future generations.

Definitions of Green Jobs vary across institutions, but all share a focus on environmental sustainability. This study includes all Green Jobs, with a special focus on the subset that is water-dependent or "green-blue".

Definitions can help direct analysis. For this study, the consulting team chose a definition that has supporting data (e.g., industry-level job data) in order to most closely align the quantification with the definition.

Community resilience includes a much wider group of jobs related to creating resilient systems that can bounce back more easily from shocks like wildfires, earthquakes, and storm surges, and allow the local community to support itself in the event it is cut off from global supply chains include installing solar emergency microgrids and natural levees, creating local food systems and worker-owned cooperatives. While those jobs are not quantified in this study due to data limitations, it's important to recognize that a resilient Richmond will require investment in these jobs as well.

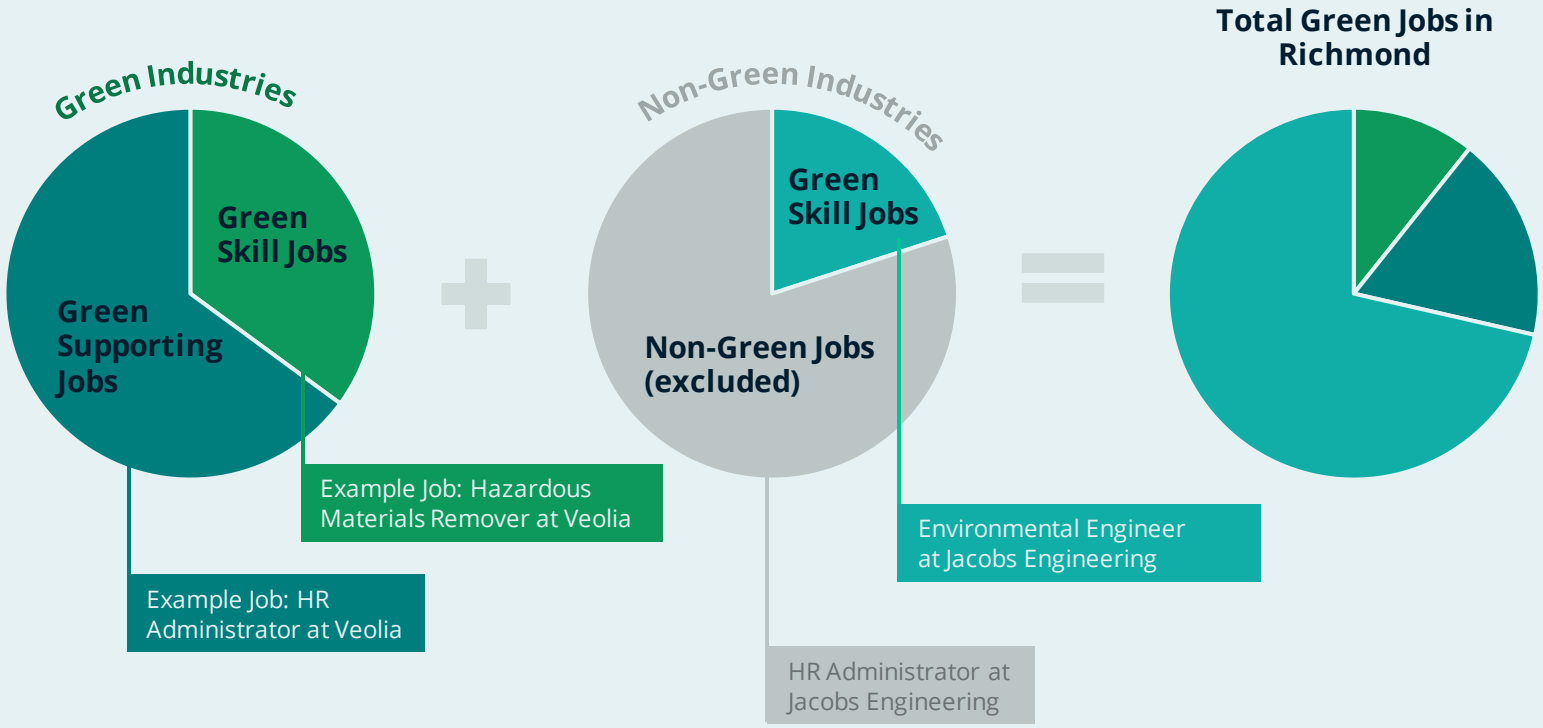


As part of a workforce development plan, this Community Profile focuses on jobs that require Green Skills and other jobs that support Green Industries.

This study conservatively quantifies Green Jobs using a skills-based methodology, thus defining "Green Jobs" as those that explicitly use Green Skills and/or support green industries. **Green Jobs** contribute to preserving or enhancing the natural environment for current and future generations.

This study identifies two types of Green Jobs. **Green Skill Jobs** require specific skills related to preserving or enhancing the natural environment. **Green Supporting Jobs** do not require Green Skills but are in an industry whose activities preserve or enhance the natural environment.

Green-Blue Jobs, occasionally called out in the dataset, are Green Jobs that are water-dependent. These jobs are already quantified within Green Skill Jobs and Green Supporting Jobs, but are highlighted separately due to Richmond's coastal proximity and port economy.



To assess the differences between types of jobs, this study further divides jobs into four occupational categories.

TECHNICAL SERVICES

Require a high level of technical training and skill.

SOC Categories:

- 15: Computer and Mathematical Occupations
- 17: Architecture and Engineering Occupations
- 19: Life, Physical, and Social Science Occupations
- 23: Legal Occupations

Examples: Computer technology professionals, software engineers, architects, engineers, environmental lawyers, environmental scientists.

OFFICE MANAGEMENT & OPERATIONS

Support day-to-day operations of green businesses and promote green products and services.

SOC Categories:

- 11: Management Occupations
- 13: Business and Financial Operations Occupations
- 41: Sales and Related Occupations
- 43: Office and Administrative Support Occupations

Examples: Outreach directors, office administrators, business directors, sustainability officers, managers, sales associates.

PRODUCTION, CONSTRUCTION, & TRANSPORTATION

Produce or repair green products, construct green buildings and infrastructure, or transport green products.

SOC Categories:

- 47: Construction and Extraction Occupations
- 49: Installation, Maintenance, and Repair Occupations
- 51: Production Occupations
- 53: Transportation and Material Moving Occupations

Examples: Construction workers, mechanics, drivers, contractors, electricians, maintenance workers.

OTHER SERVICES & PROFESSIONS

Green jobs that do not fit into the previous three categories, including healthcare, education, arts, food preparation, and compliance occupations.

SOC Categories:

- All others

Examples: Film makers, travel guides, librarians, graphic designers, community organizers, garden managers, .

Key Takeaways

1. Richmond has approximately 51,000 total jobs.

2. Richmond's key sectoral strengths relate to utilities, water transportation, building construction, machinery repair/maintenance industries, and research & development. These key industries point toward opportunities for the creation of high-road Green Jobs.

3. There are over 2,300 Green Jobs in Richmond, meaning almost one in every 20 jobs requires Green Skills, is in a Green Industry, or both.

4. Green Jobs make up a greater share of jobs in Richmond than in the County and the San Francisco MSA. However, between 2010-2019, Green Job growth in Richmond lagged overall job growth, while in the County and the MSA, Green Jobs grew at par with overall jobs.

Key Takeaways

1. 40% of Green Jobs are in Production, Construction, and Transportation occupations, which typically do not require a college degree, but also tend to pay less than the average job.

2. Three percent of all Green Jobs in Richmond are readily identifiable as "Green-Blue Jobs" as they require Green Skills and are in water-dependent occupations.

3. Green Skills related to environmental health/safety, environmental science, and environmental regulations are commonly sought by employers in Richmond.

4. Many Green Jobs demand common non-Green Skills such as communication and management, meaning many workers are already partially qualified to work in Green Jobs.

5. Veolia, Republic Services, Schnitzer Steel, Cascade Environmental, and ICF International are actively hiring for the greatest number of positions that require Green Skills.

Key Takeaways

1. The average Green Job in Richmond pays $36 per hour, 24% higher than the average local job.

2. Green Jobs that require Green Skills tend to pay 41% more than Supporting Green Jobs, which are jobs in Green Industries that don't require Green Skills.

3. For jobs that don't require a college degree, Green Jobs pay a 17% premium ($4 more per hour).

4. Green jobs that require a college degree pay on average 85% more than those that don't—a lower education premium for Green Jobs than for jobs overall.

Key Takeaways

1. The racial and ethnic breakdown of Green Jobs is similar to that of the overall worker population in Contra Costa County.

2. Green industries tend to be more diverse than non-green industries, with significantly higher representation of Black and Hispanic workers, though slightly lower Asian representation.

3. Although wages in Green Jobs rose faster for non-white workers from 2010 to 2021 than for white workers, Black and Hispanic workers still earn $14,100 less per year than white workers.

4. Half of Richmond's workforce is female, but women hold less than one-third of its Green Jobs.

5. Among Green Jobs, there is a $4,000 pay gap between men and women, though it was almost 1.5 times as large in 2010.

Economic Development Insights

1. Richmond's key sectoral strengths relate to **utilities**, **water transportation**, **building construction**, **machinery repair/maintenance**, and **research & development**. These key industries point toward opportunities for the creation of high-road Green Jobs.

2. Existing sectoral strengths reflect Richmond's locational and physical assets, such as its **waterfront**, its **port**, its stock of **industrial buildings**, and its proximity to Bay Area **innovation clusters**. The City can leverage and reinforce each existing asset.

3. The City of Richmond has **planned significant infrastructure investments** for the next five years, many of which support environmental resilience and create Green Jobs in both construction and operation of those projects, for example, improving the efficiency of city-owned buildings and electrifying the port.

4. Even more impactful than directly supporting Green Jobs (e.g., by retrofitting its own buildings) the City will have opportunities to **catalyze green private investment and job growth** (e.g., by improving port facilities and supporting business incubation).

5. Without concerted effort, Richmond risks **falling further behind regional peers** with respect to Green Job growth.

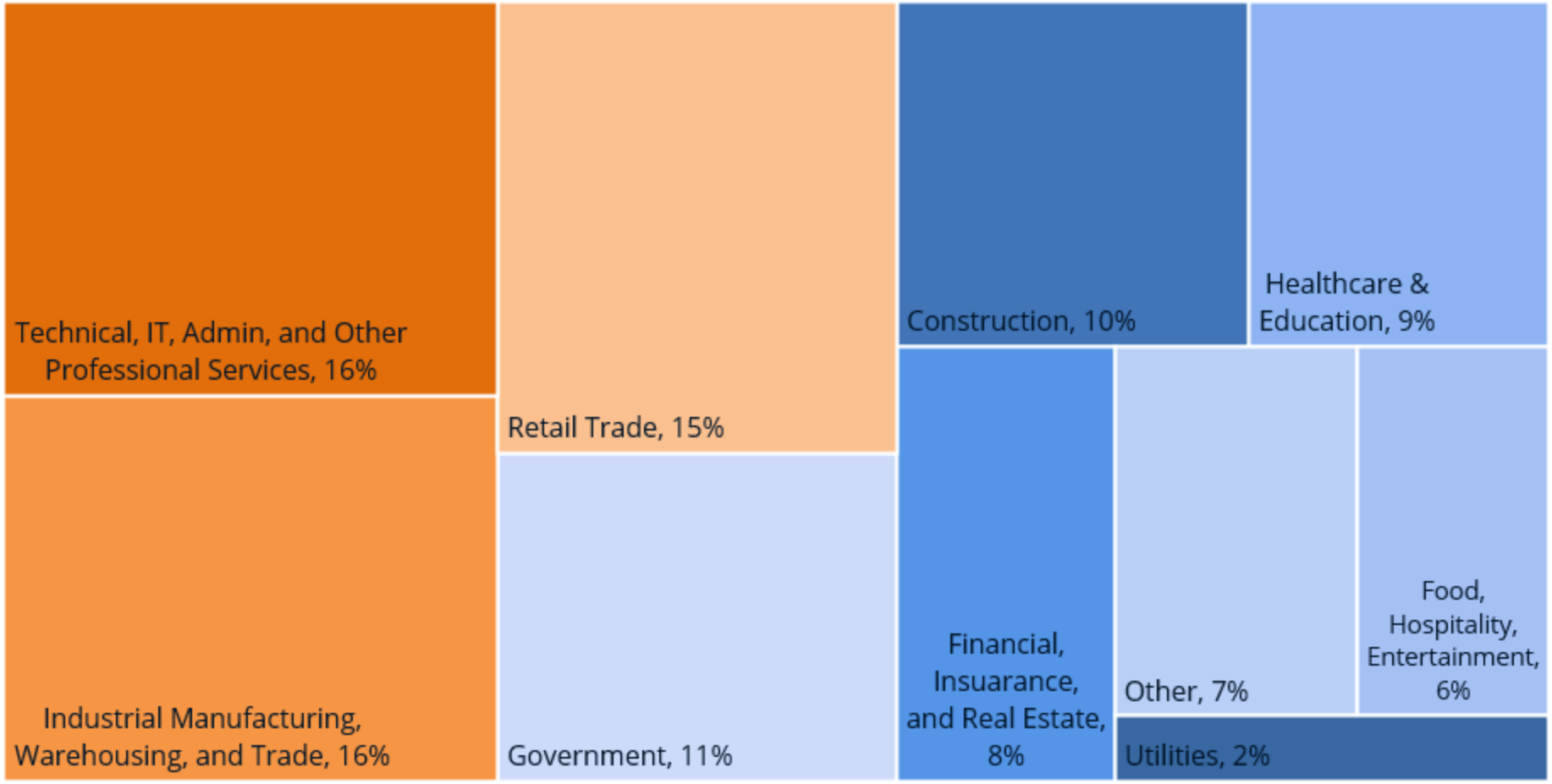
6. Targeted **workforce development and job placement efforts**—including coordination with prospective employers—is needed so that Green Job opportunities are available to Richmond residents of all backgrounds and so that the **injustices of past waves of economic growth are not repeated**.

ANALYSIS HIGHLIGHTS

Almost one-half of Richmond's workforce is employed in one of its top three sectors: professional services, industrial trades, and retail.

51,400 Jobs

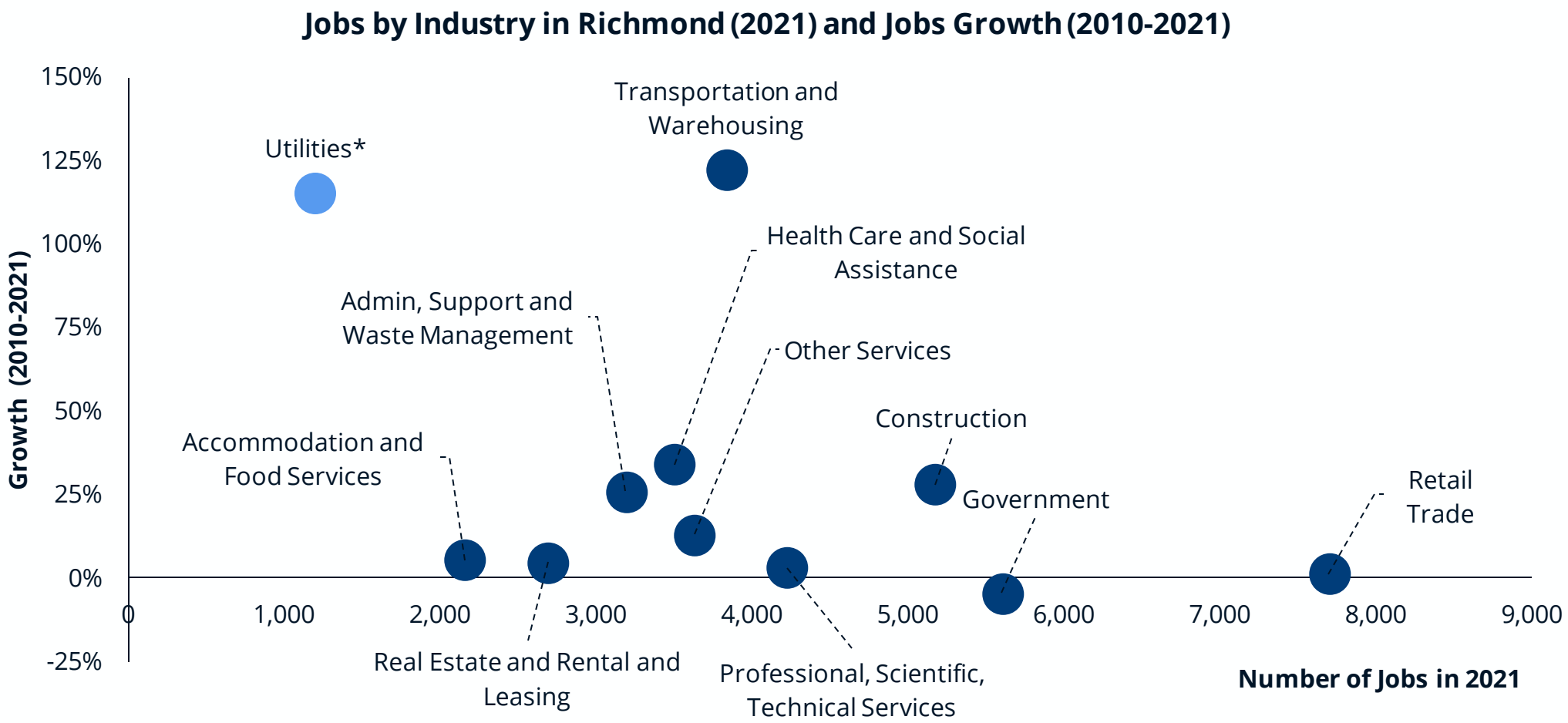
total jobs in Richmond (2021)



Source: HR&A's analysis of Lightcast data of 21 2-digitNAICS industries, grouped into sectors.

ANALYSIS HIGHLIGHTS | INDUSTRY STRENGTHS

After Retail Trade, the largest industries in Richmond by employment are Government and Construction. Transportation & Warehousing and Utilities are the fastest growing industries.



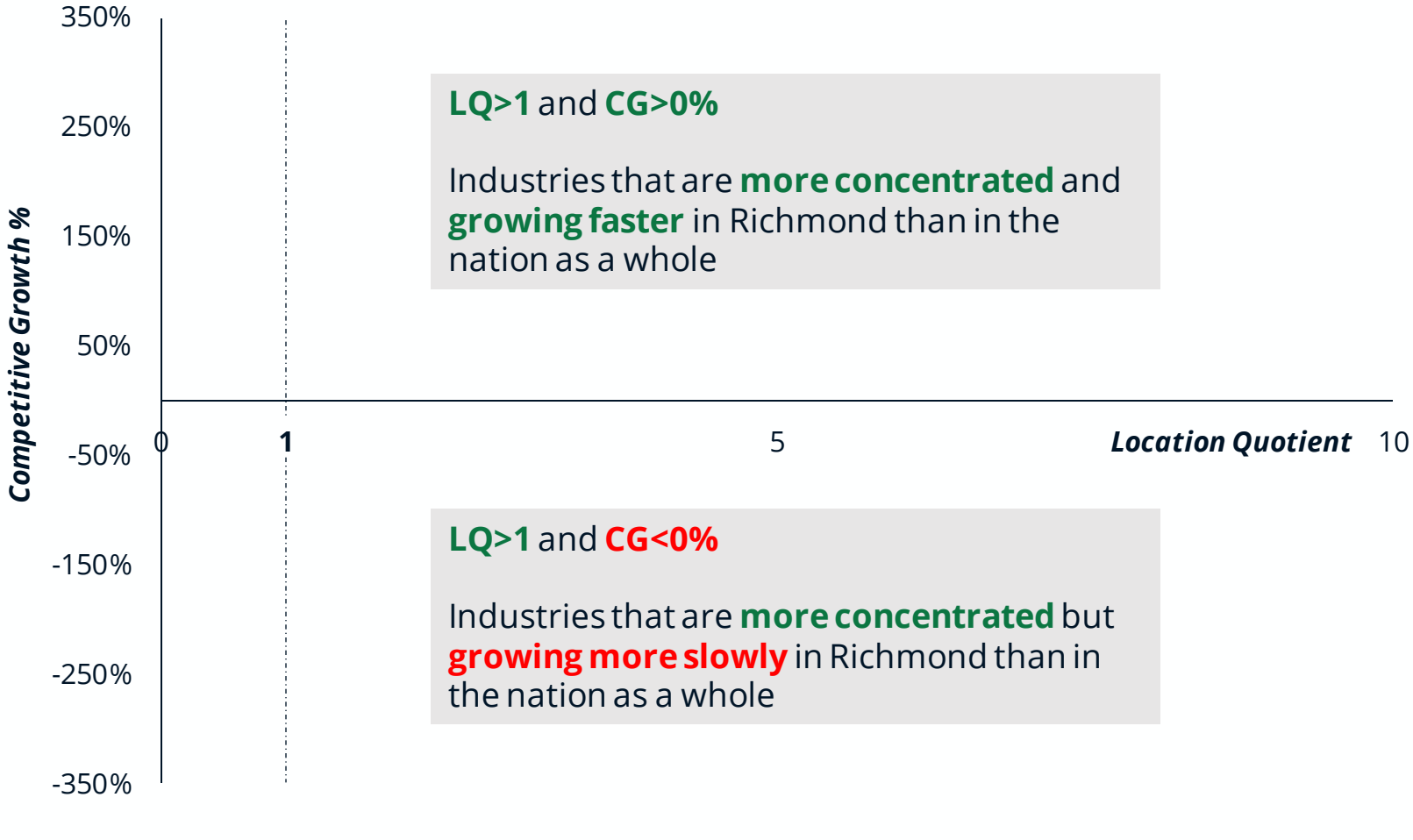
Source: HR&A's analysis of Lightcast data, top 10 by number of jobs out of 21 2-digit NAICS industries. *Not in top 10 but added for relevance.

ANALYSIS HIGHLIGHTS | INDUSTRY STRENGTHS

Location quotient and competitiveness effect are two metrics that highlight strengths by comparing local economic performance to national performance within specific industries.

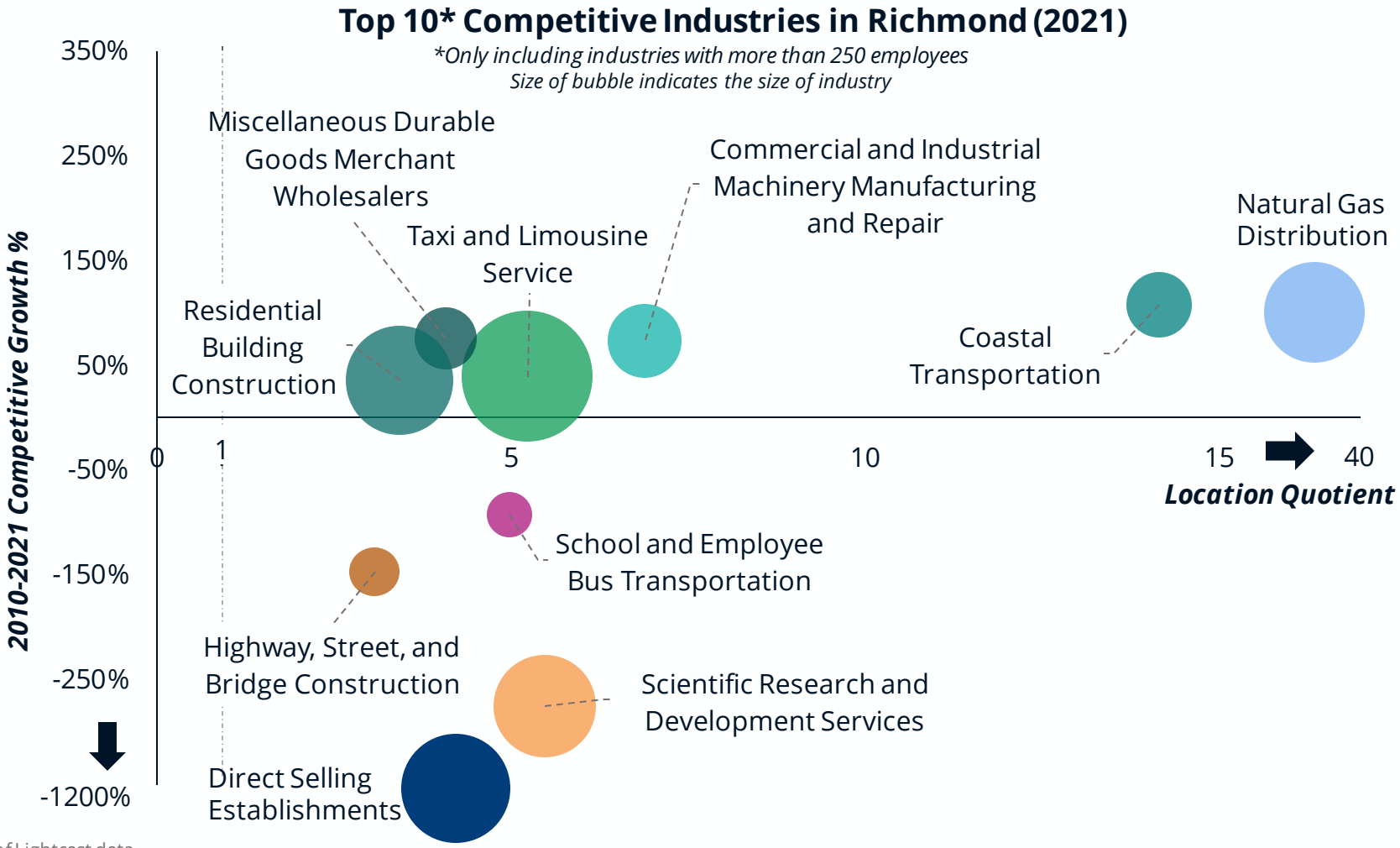
Location quotient (LQ) quantifies how concentrated a particular industry is in a region as compared to the nation. An LQ of 1 means the region and the nation have the same composition of a particular industry, an LQ greater than 1 means that the particular industry is more concentrated in the region than the nation, and an LQ less than one means that the particular industry is less concentrated in the region than the nation. For example, a LQ of 3 for an industry means that that industry makes up a 3 times greater share of employment the region of study than in the nation overall.

The regional **competitiveness effect** explains how much of the change in a given industry is due to some unique competitive advantage that the region possesses. This effect is calculated by taking the total regional growth and subtracting the national growth for the same industry. The regional growth that remains cannot be explained by national trends in that industry or the economy as a whole. For example, a competitiveness effect of 200% for an industry means that the industry grew at double the rate within the region than in the nation ats a whole.



Source: HR&A's analysis of Lightcast data, out of 301 4-digit NAICS industries.

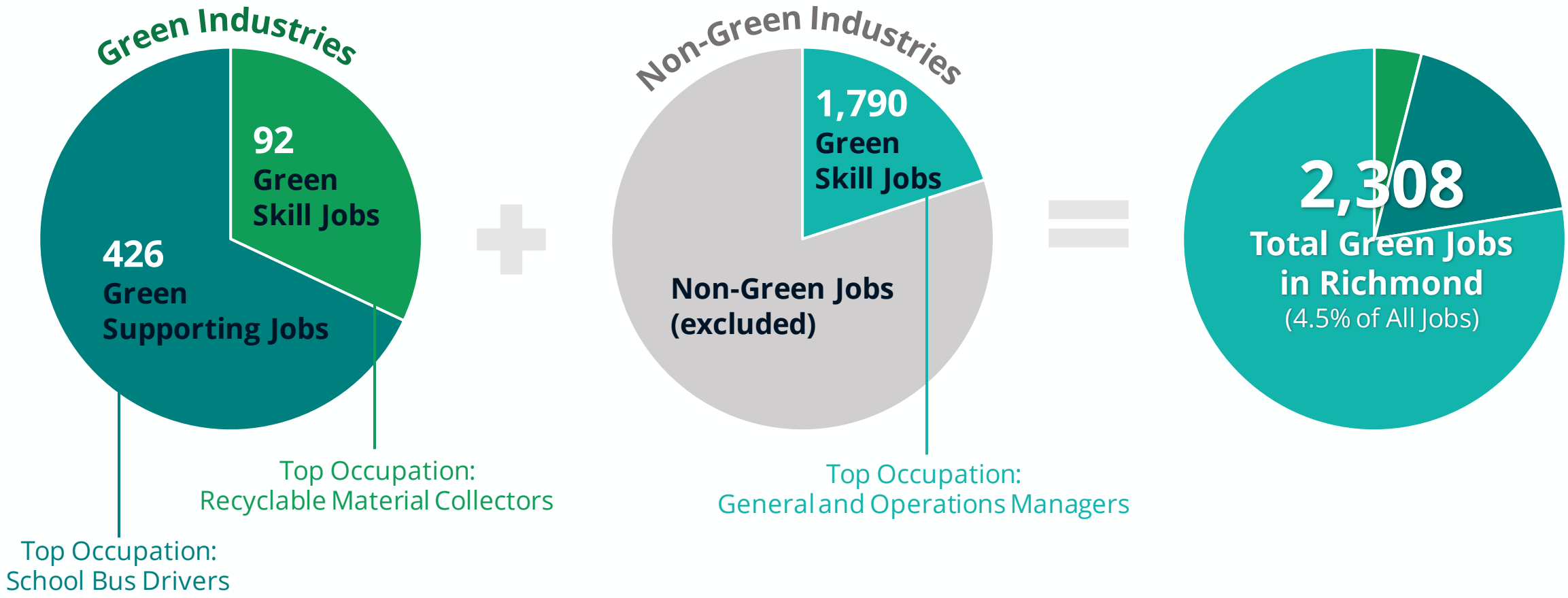
Natural Gas Distribution, Water Transportation, and Scientific R&D have high LQs and large workforces in Richmond.



Source: HR&A's analysis of Lightcast data, out of 301 4-digit NAICS industries.

ANALYSIS HIGHLIGHTS | GREEN JOB TOTALS

Today, Richmond's economy includes approximately 2,308 Green Jobs across both green (22%) and non-green (78%) industries. Further, 82% Green Jobs require specialized Green Skills, while the other 18% are supporting jobs in green industries.



Source: HR&A's analysis of Lightcast data. Diagram not to scale.

ANALYSIS HIGHLIGHTS | INDUSTRY STRENGTHS

Several of Richmond's key industries are critical to the green economy.

Industry	Key Stats (2010-2021)	Implications for Green Jobs
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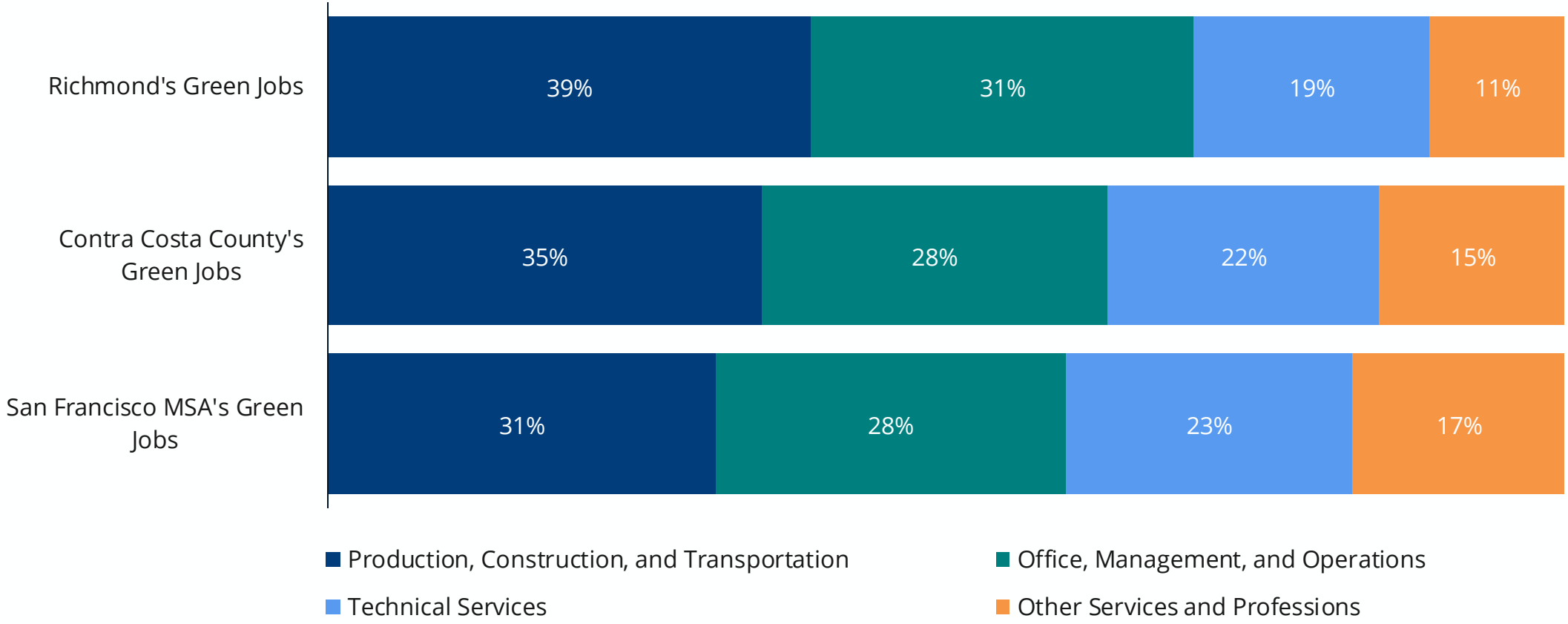
Source: HR&A's analysis of Lightcast data.

ANALYSIS HIGHLIGHTS | OCCUPATION CATEGORIES

In Richmond, 39% of Green Jobs are in Production, Construction, and Transportation occupations, whereas in surrounding areas, Green Jobs are more evenly divided between occupation categories.

Green Jobs by Occupation Group, by Region (2021)

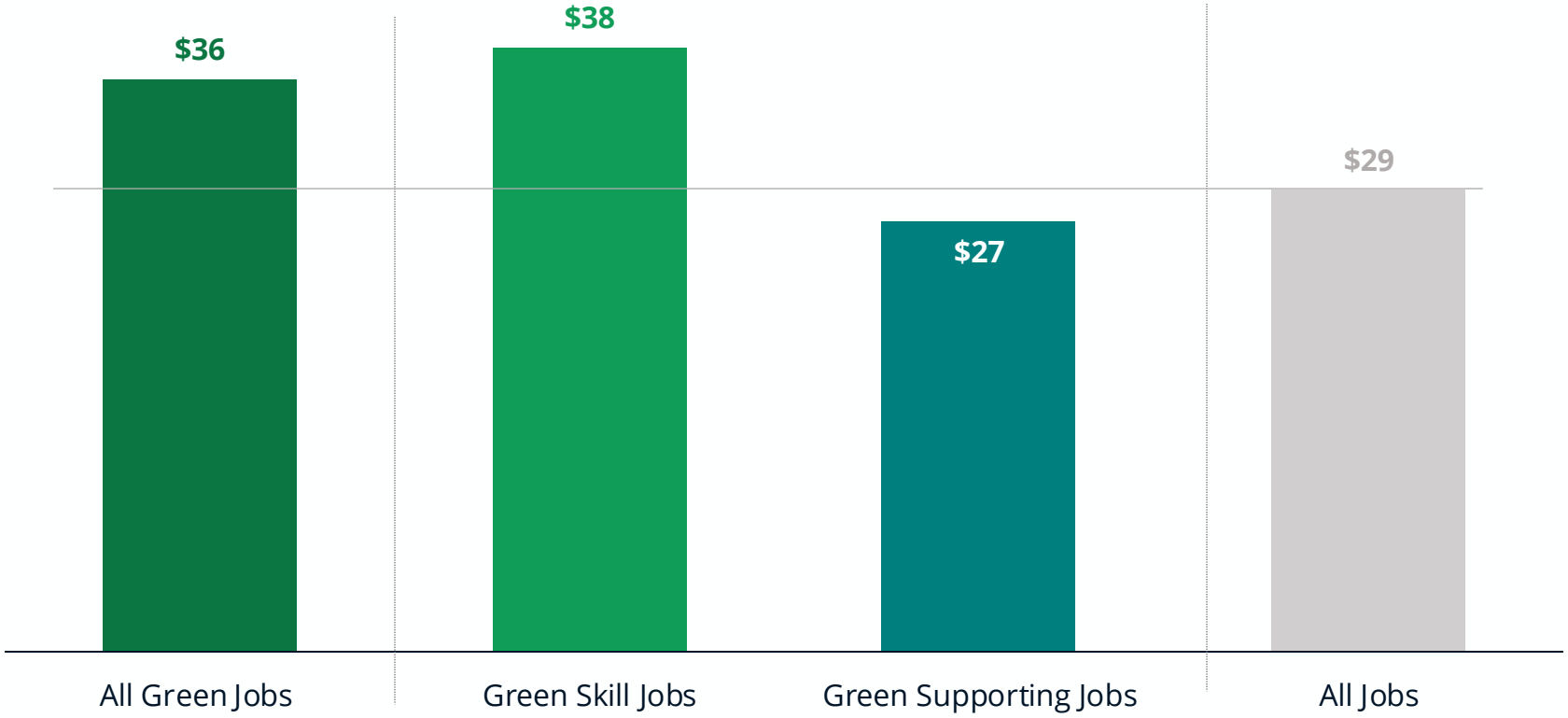


Source: HR&A's analysis of Lightcast data.

ANALYSIS HIGHLIGHTS | WAGES

Overall, Green Job workers earn 24% higher wages compared to the average Richmond worker. Within Green Jobs, Green Skill Jobs pay a 31% premium, while wages in Green Supporting Jobs are slightly lower than the overall economy.

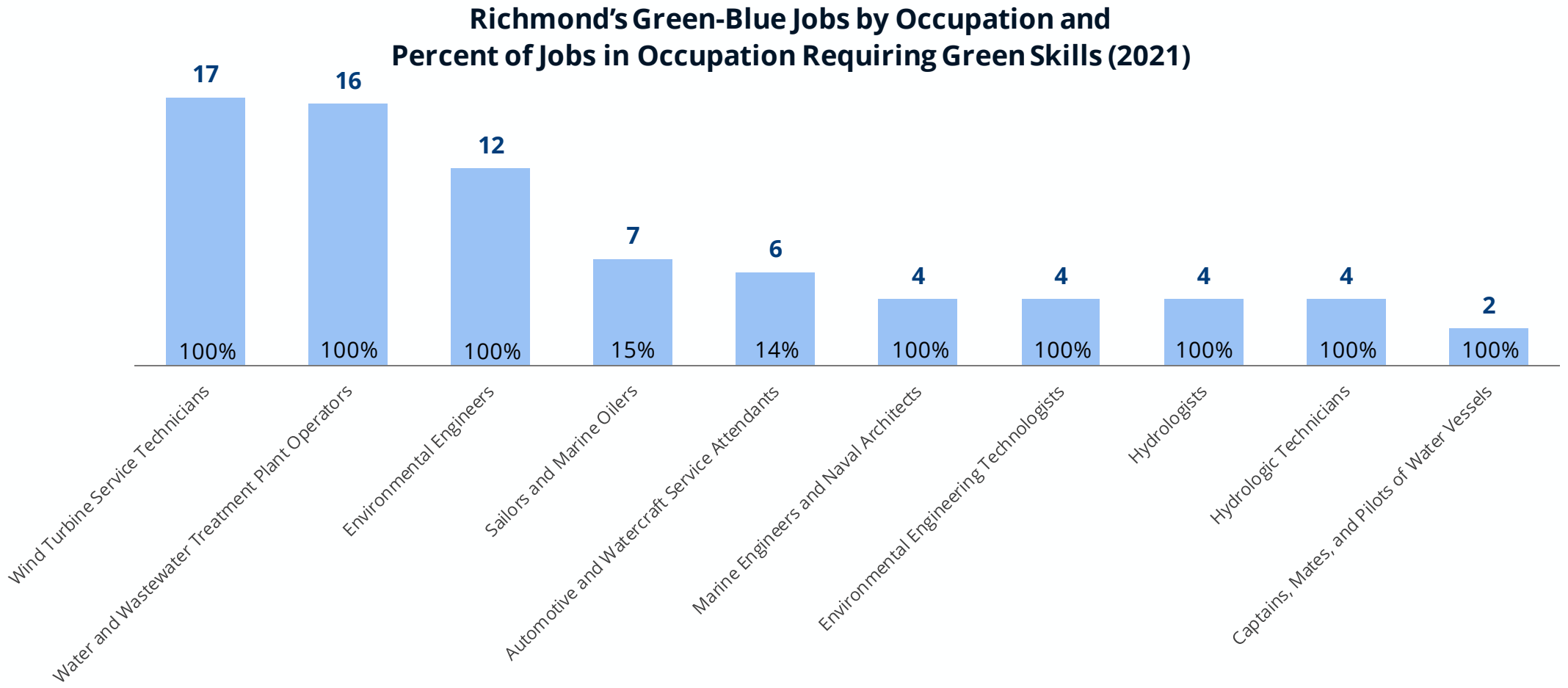
Median Hourly Wage of Green Jobs by category in Richmond (2021)



Source: HR&A's analysis of Lightcast data.

ANALYSIS HIGHLIGHTS | GREEN-BLUE OCCUPATIONS

There are 77 jobs in Richmond readily identifiable as being in "Green-Blue Jobs", comprising 3% of all Green Jobs. These jobs require Green Skills and are in occupations that are significantly involved in the blue economy.

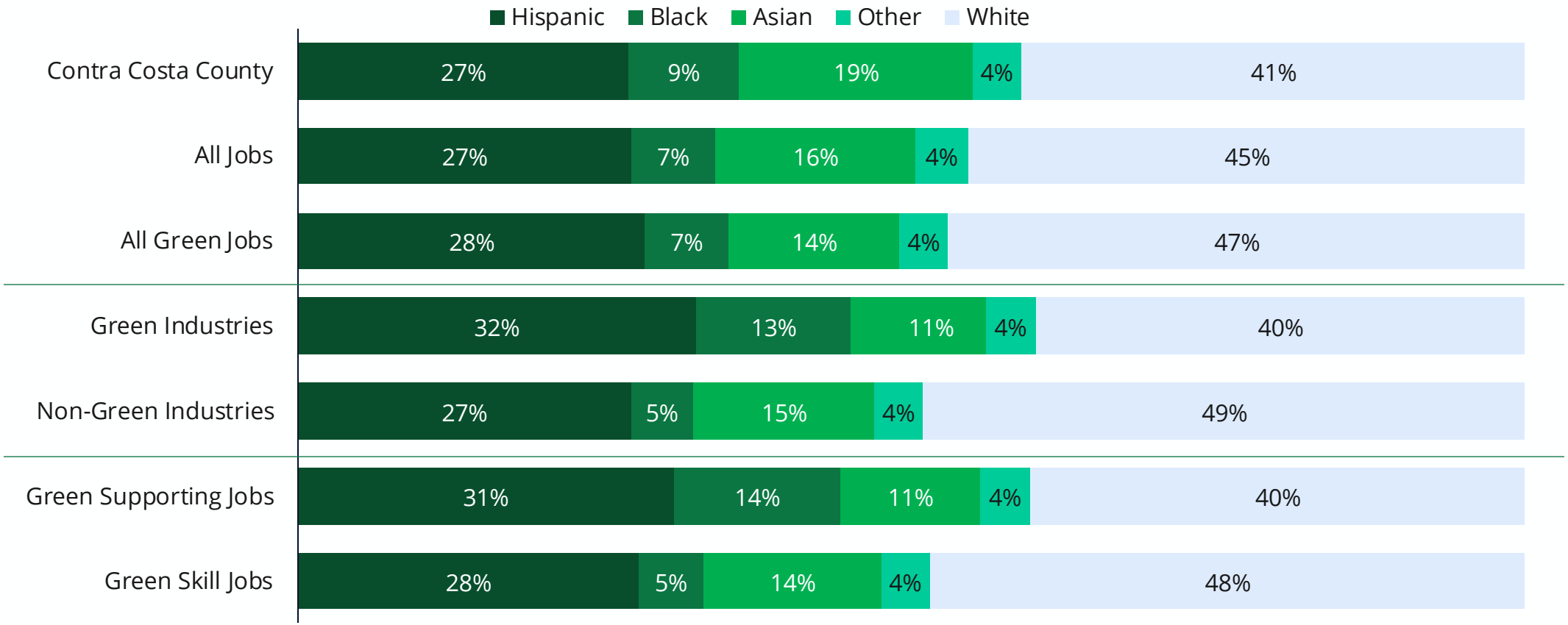


Source: HR&A's analysis of analysis of 50,781 job postings from 2017-2021 through Lightcast, out of 867 5-digit SOC occupations.

ANALYSIS HIGHLIGHTS | RACE & ETHNICITY

Green Jobs are racially representative of Contra Costa County's overall economy but not of its population. Among Green Jobs, Green Supporting Jobs are more diverse than Green Skill Jobs. Similarly, green industries are more diverse than non-green industries.

Racial Representation, by Category (2021)



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

ANALYSIS HIGHLIGHTS | TOP-HIRING EMPLOYERS

Veolia, Republic Services, Schnitzer Steel, Cascade Environmental, and ICF International are actively hiring the greatest number of Green Skill Jobs in Richmond.

VEOLIA ENVIRONMENTAL SERVICES

Examples: Wastewater Operators, Collections Technicians, Maintenance Technicians

CASCADE

Examples: Driller Assistants, Drillers, Field Assistants

Schnitzer

Examples: Customer Service Advisors, Production Crews, Vehicle Purchasing Agents

REPUBLIC SERVICES

Examples: Recycling Truck Drivers, Transfer Drivers, Landfill Heavy Equipment Operators

ICF

Examples: Environmental Chemists, Data Validation Specialists, Chemistry Laboratory Technicians

Source: HR&A's analysis of Lightcast data. Examples represent the top green skill job titles at each company by number of postings in recent years.

Green Jobs in Richmond most often require Management, Communications, and Operations Skills in addition to Green Skills such as Environmental Health & Safety.

Top 5 Skills in Jobs Requiring Green Skills

Where size of bubbles represents relative occurrence of these skills.

Top 5 Green Skills in Green Jobs

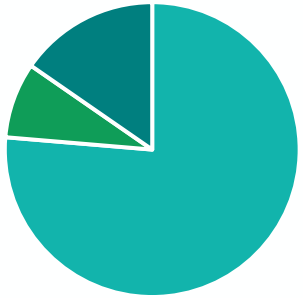
Where size of bubbles represents relative occurrence of these skills.

Source: HR&A's analysis of Lightcast data.

Many Green Jobs demand common non-Green Skills such as communication and management, meaning many workers are already partially qualified to work in Green Jobs.

Green Skill Jobs and Supporting Jobs

in both green and non-green industries

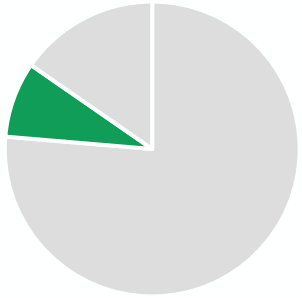


The top skills listed across all Green Job postings include communications, management, and operations. Additional skills include customer service, leadership, writing, and planning. This indicates that many professionals may be able to readily be employed in Green Jobs despite preconceived notions about the prerequisites.

Sample Green Job Titles Posted in Richmond: General Managers, Production Supervisors, Research Associates, Project Managers, Maintenance Supervisors

Green Skill Jobs

in green industries

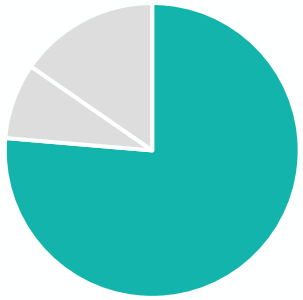


Some Green Skill Jobs call for environmentally-specific skills like data compilation, environmental planning, or wastewater operator certification.

Sample Green Job Titles Posted in Richmond: Laboratory Technicians, Chemical Process Operators, Field Assistants, Project Engineers, Environmental Chemists

Green Skill Jobs

in non-green industries



Finally, in non-green industries, many workers may develop Green Skills that they use during some parts of their job. For instance, construction and operations are both frequently listed in green skill job postings – many construction professionals have transferrable skills that can be used in Green Jobs.

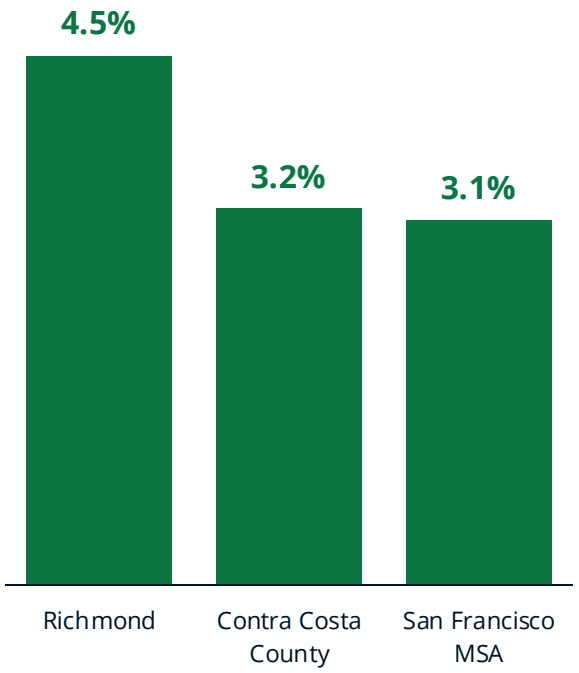
Sample Green Job Titles Posted in Richmond: Operator Helpers, Maintenance Technicians, Drillers, Recycling Truck Drivers, Production Crews, Warehouse Receivers, Vehicle Maintenance

Source: HR&A's analysis of Lightcast data.

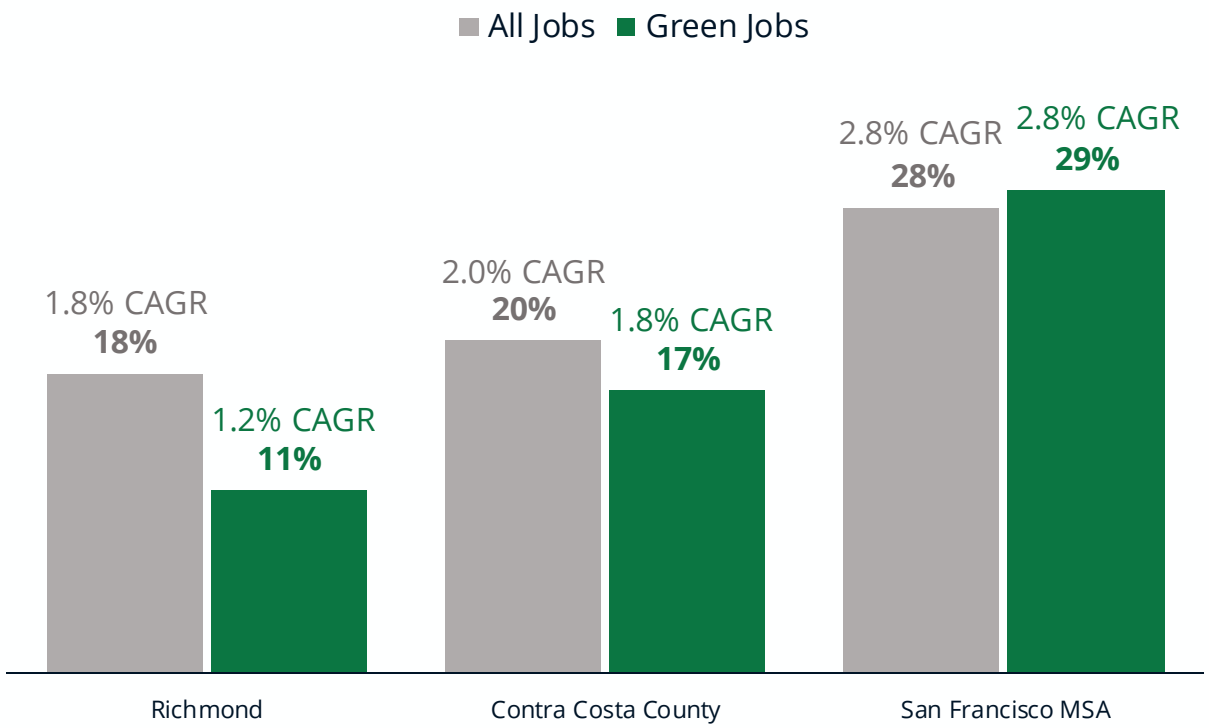
ANALYSIS HIGHLIGHTS | COMPARATIVE GROWTH TRENDS

Green Jobs make up a greater share of jobs in Richmond than in the County and the MSA. However, between 2010-2019, Green Job growth in Richmond lagged the overall job growth, while in the County and the MSA, Green Jobs grew almost at par with overall jobs.

Share of Green Jobs in Entire Workforce, by Region (2021)



Jobs Growth, by Region (2010-2019)

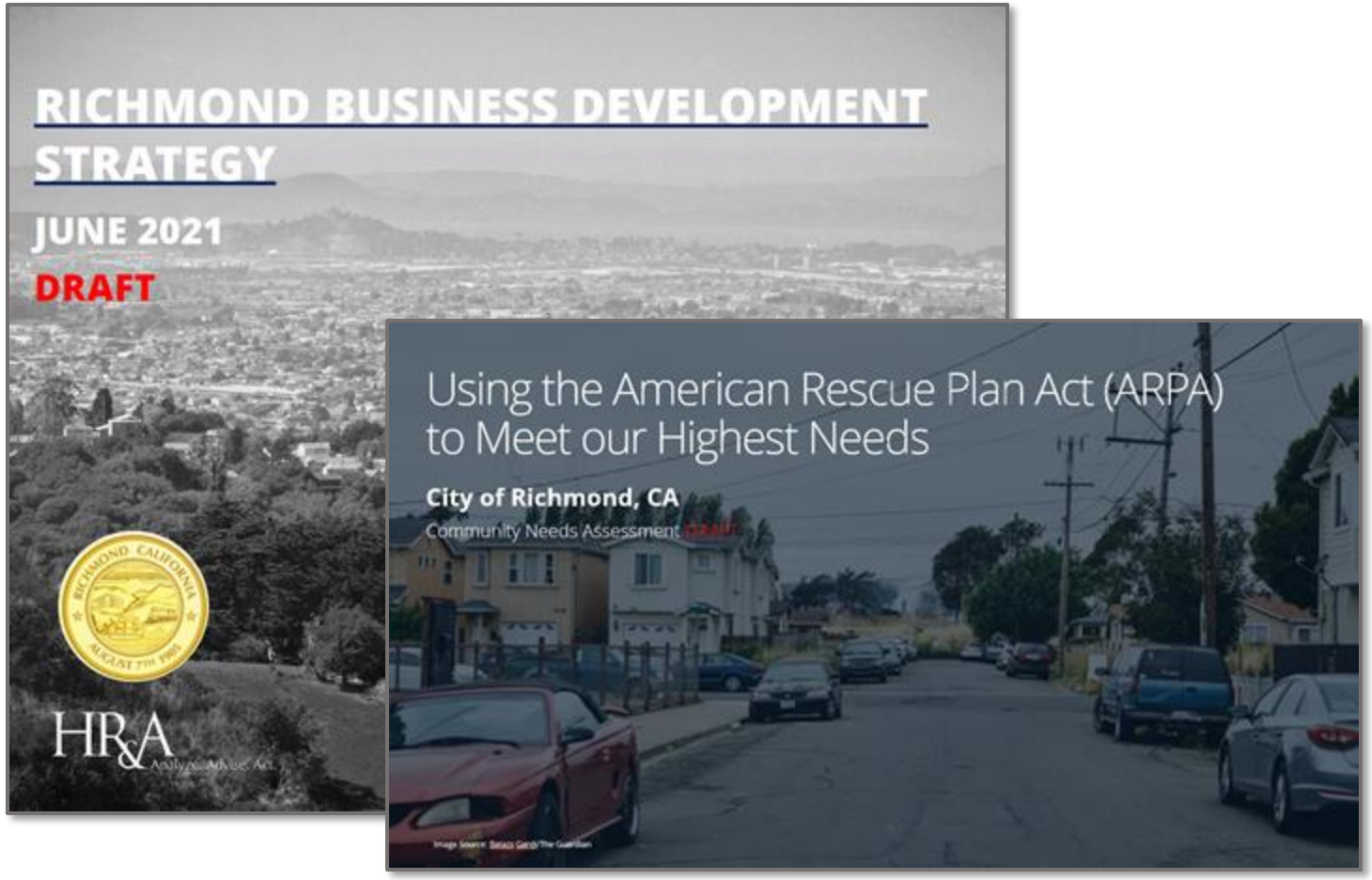


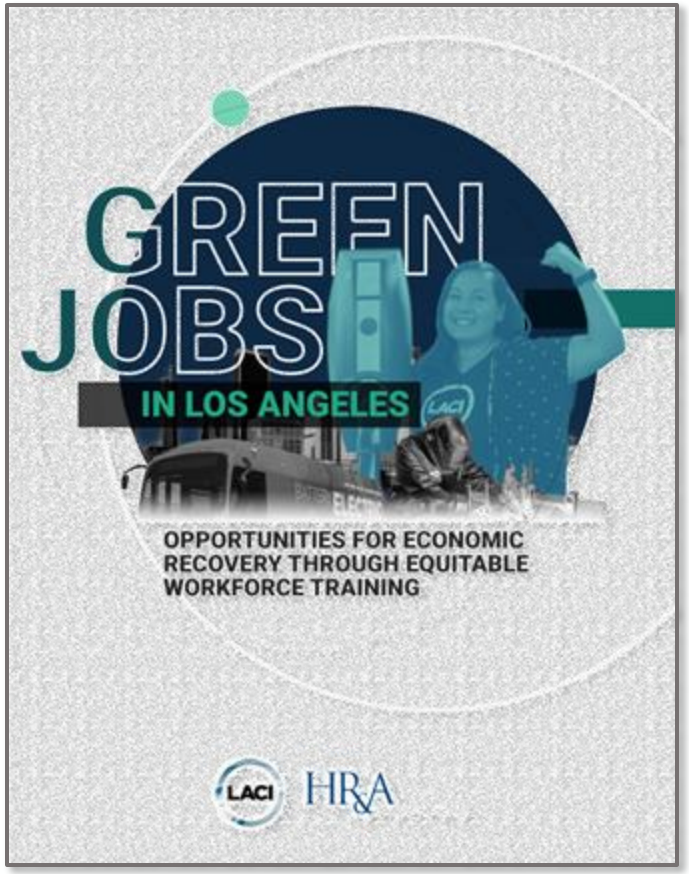
Source: HR&A's analysis of Lightcast data.

01

INTRODUCTION

HR&A Advisors is a national consulting firm providing services in inclusive growth, urban tech and innovation, program design and implementation, and place-based initiatives.





HR&A is supporting the Appraccel team by profiling Richmond's green-blue economy.

The Community Profile addresses the following key questions:

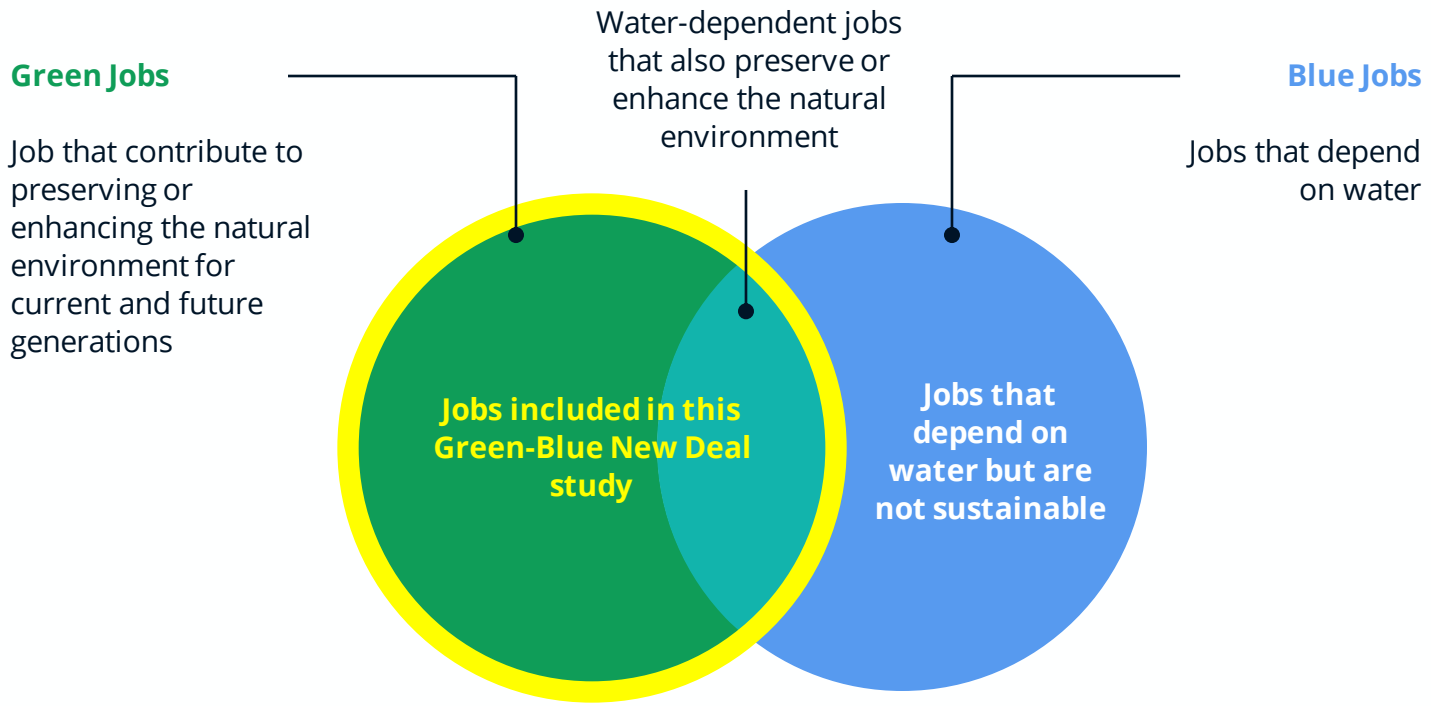
1. Which of Richmond's economic strengths are most relevant to the creation of Green Jobs?
2. How many Green Jobs are in Richmond today?
3. Which occupations and industries in Richmond have the most Green Jobs?
4. What are the demographics and wages of workers in Richmond Green Jobs?
5. How does Richmond's green economy compare to that of the county and metro area?

A green job is one that contributes to preserving or enhancing the natural environment for current and future generations.

Definitions of Green Jobs vary across institutions, but all share a focus on environmental sustainability. This study includes all Green Jobs, with a special focus on the subset that is water-dependent or "green-blue".

Definitions can help direct analysis. For this study, the consulting team chose a definition that has supporting data (e.g., industry-level job data) in order to most closely align the quantification with the definition.

Community resilience includes a much wider group of jobs related to creating resilient systems that can bounce back more easily from shocks like wildfires, earthquakes, and storm surges, and allow the local community to support itself in the event it is cut off from global supply chains include installing solar emergency microgrids and natural levees, creating local food systems and worker-owned cooperatives. While those jobs are not quantified in this study due to data limitations, it's important to recognize that a resilient Richmond will require investment in these jobs as well.



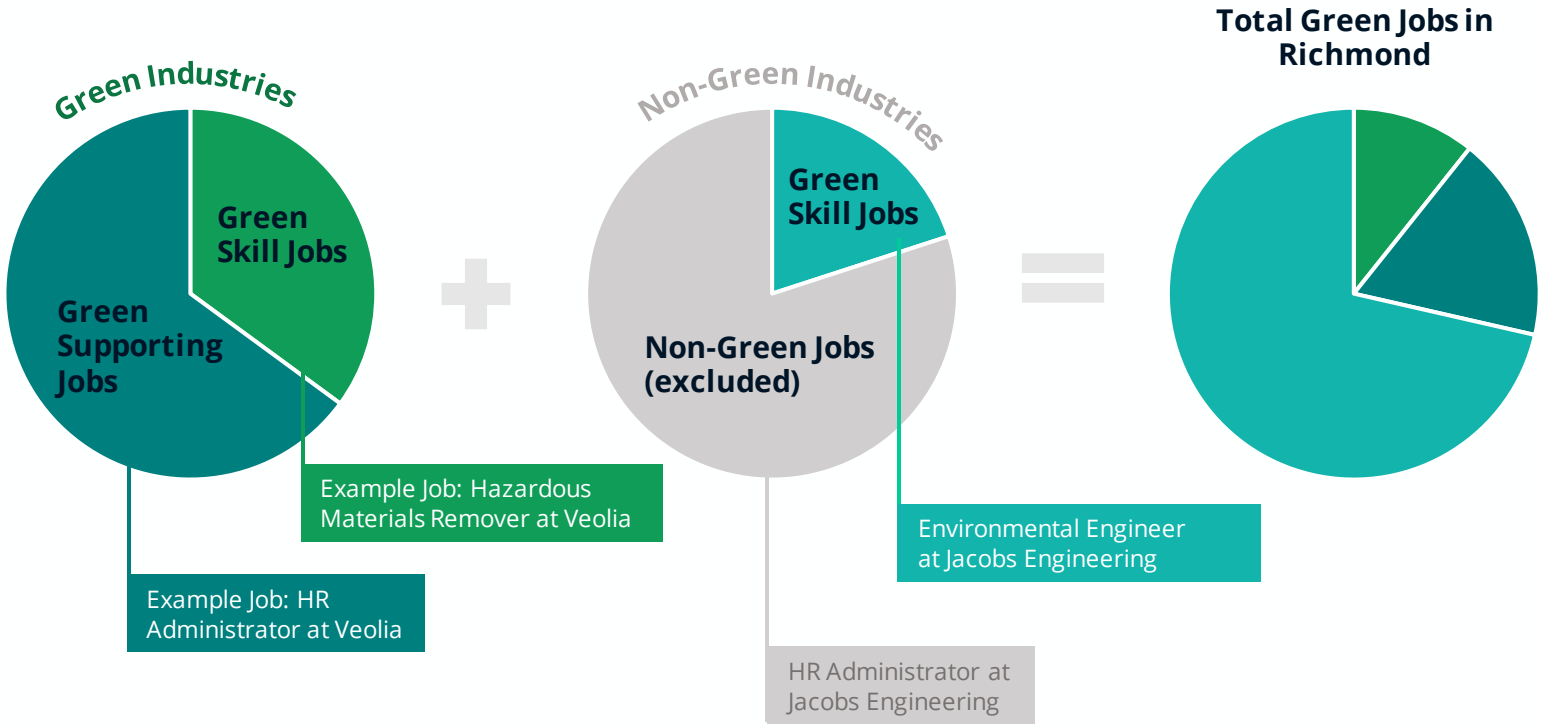
INTRODUCTION | GREEN-BLUE JOB DEFINITION

As part of a workforce development plan, this Community Profile focuses on jobs that require Green Skills and other jobs that support Green Industries.

This study conservatively quantifies Green Jobs using a skills-based methodology, thus defining "Green Jobs" as those that explicitly use Green Skills and/or support green industries. **Green Jobs** contribute to preserving or enhancing the natural environment for current and future generations.

This study identifies two types of Green Jobs. **Green Skill Jobs** require specific skills related to preserving or enhancing the natural environment. **Green Supporting Jobs** do not require Green Skills but are in an industry whose activities preserve or enhance the natural environment.

Green-Blue Jobs, occasionally called out in the dataset, are Green Jobs that are water-dependent. These jobs are already quantified within Green Skill Jobs and Green Supporting Jobs, but are highlighted separately due to Richmond's coastal proximity and port economy.



INTRODUCTION

This study uses the best available data on jobs and job postings in Richmond to estimate the number of Green Jobs and characterize worker demographics.

GREEN SKILL JOBS

1. Using historic job postings on Lightcast[1], first determine the percentage of jobs in each occupation that require Green Skills.
2. Pro-rate each occupation's share of Green Skill Jobs by applying the green skill requirement percentage to the total number of jobs in that occupation.

Total Jobs in Richmond, by Occupation (Lightcast Estimate) × (Job Postings with Green Skills in Richmond ÷ Total Job Postings in Richmond) = Total Estimated **Green Skill Jobs** in Richmond

Green Skill Requirement Percentage, by Occupation

GREEN SUPPORTING JOBS

1. Using Lightcast[1], calculate total jobs in green industries, based on a national Bureau of Labor Statistics (BLS) survey on the percent of each industry's revenue derived from green activities.
2. Subtract the Green Skill Jobs in green industries previously calculated to estimate the number of jobs that are in green industries but do not require Green Skills.

Total Jobs in Green Industries in Richmond (Lightcast Estimate) − Total Green Skill Jobs in Green Industries in Richmond = Total **Green Supporting Jobs** in Richmond

3. Categorize Green Skill Jobs and Green Supporting Jobs to enable more nuanced analysis along dimensions including skills, occupation groups, major companies, and demographics.

Green Skills and Occupational Groups

Major Companies

Occupations and Worker Demographics

*HR&A is relying on Lightcast (formerly EMSI), a third-party labor data aggregation firm, to gather the share of job postings in various industries with green skills as a share of total jobs postings over the last 3-5 years. Lightcast has a Green Skills category established through benchmarking popular studies on green jobs, which can be modified if needed to suit our definitions.

To assess the differences between types of jobs, this study further divides jobs into four occupational categories.

TECHNICAL SERVICES

Require a high level of technical training and skill.

SOC Categories:

- 15: Computer and Mathematical Occupations
- 17: Architecture and Engineering Occupations
- 19: Life, Physical, and Social Science Occupations
- 23: Legal Occupations

Examples: Computer technology professionals, software engineers, architects, engineers, environmental lawyers, environmental scientists.

OFFICE MANAGEMENT & OPERATIONS

Support day-to-day operations of green businesses and promote green products and services.

SOC Categories:

- 11: Management Occupations
- 13: Business and Financial Operations Occupations
- 41: Sales and Related Occupations
- 43: Office and Administrative Support Occupations

Examples: Outreach directors, office administrators, business directors, sustainability officers, managers, sales associates.

PRODUCTION, CONSTRUCTION, & TRANSPORTATION

Produce or repair green products, construct green buildings and infrastructure, or transport green products.

SOC Categories:

- 47: Construction and Extraction Occupations
- 49: Installation, Maintenance, and Repair Occupations
- 51: Production Occupations
- 53: Transportation and Material Moving Occupations

Examples: Construction workers, mechanics, drivers, contractors, electricians, maintenance workers.

OTHER SERVICES & PROFESSIONS

Green jobs that do not fit into the previous three categories, including healthcare, education, arts, food preparation, and compliance occupations.

SOC Categories:

- All others

Examples: Film makers, travel guides, librarians, graphic designers, community organizers, garden managers, .

02

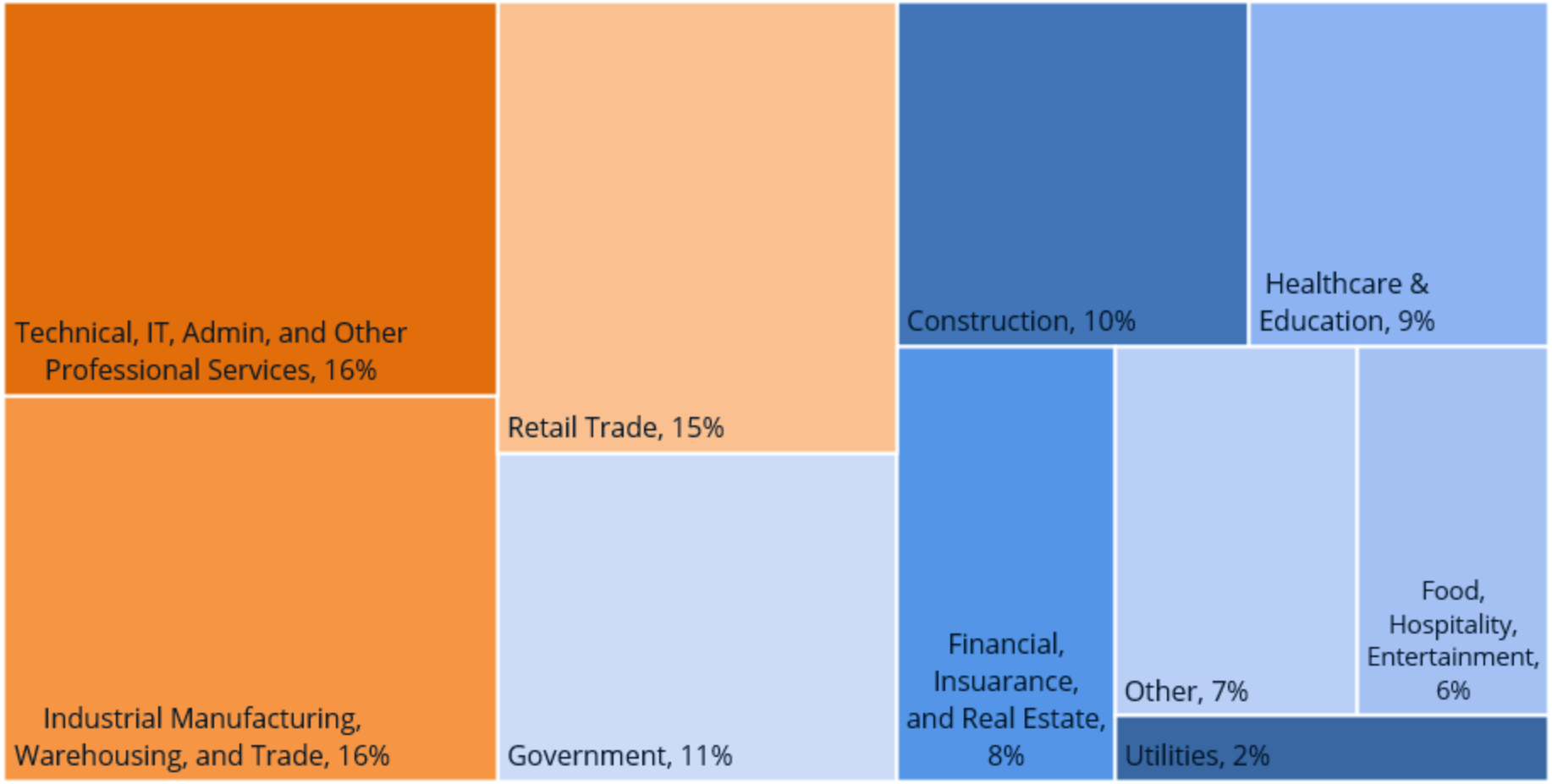
FINDINGS

RICHMOND'S OVERALL ECONOMY

Almost one-half of Richmond's workforce is employed in one of its top three sectors: professional services, industrial trades, and retail.

51,400 Jobs

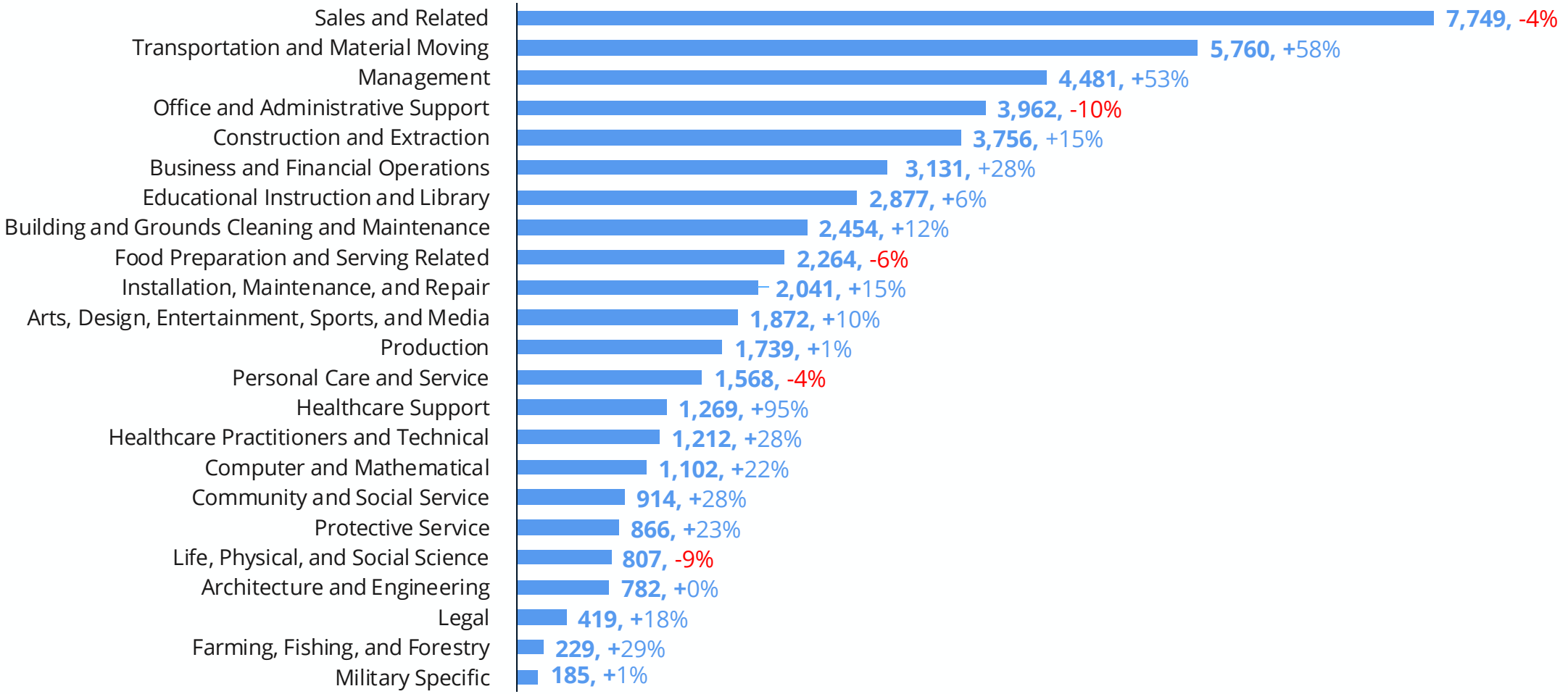
total jobs in Richmond (2021)



Source: HR&A's analysis of Lightcast data of 21 2-digit NAICS industries, grouped into sectors.

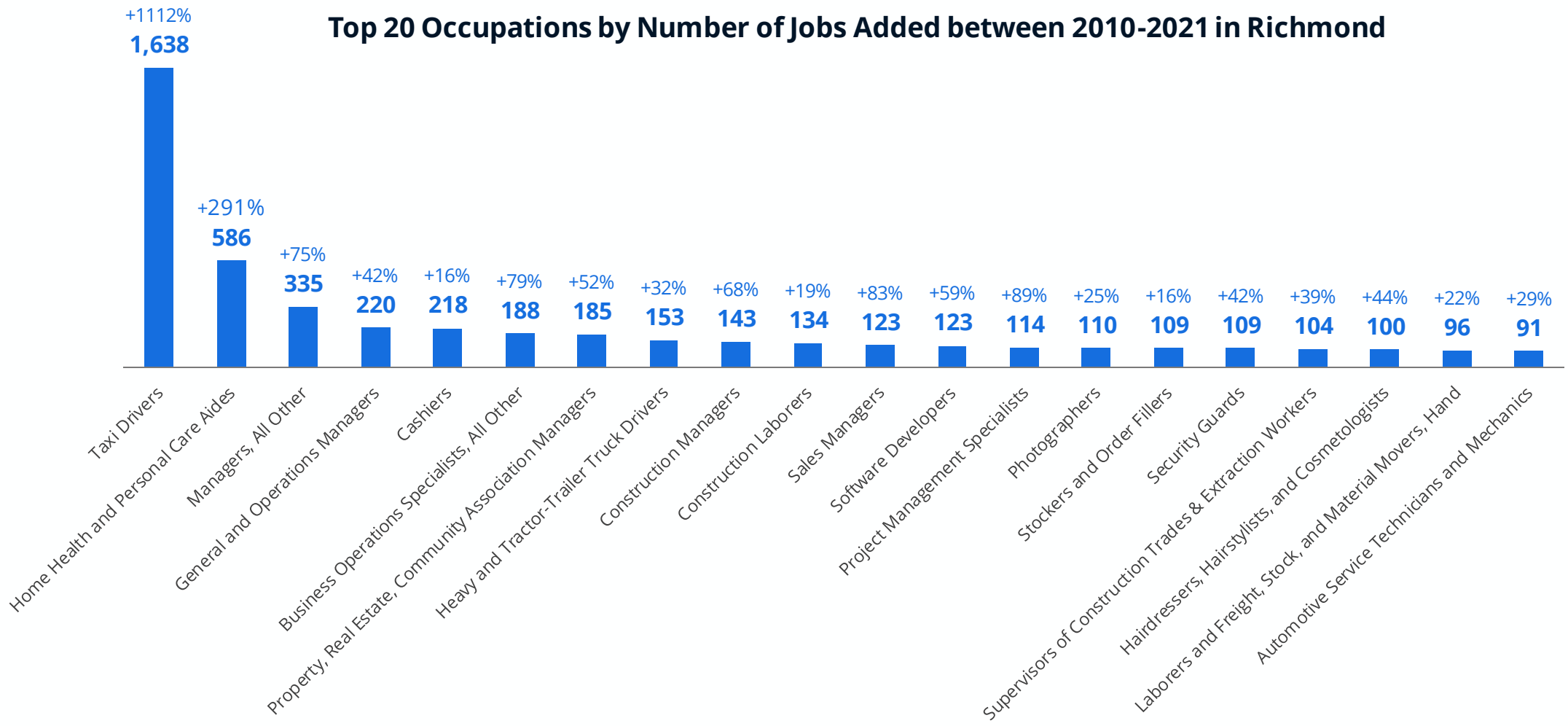
Sales occupations are the largest in Richmond, followed by Transportation & Moving, and Management occupations. Healthcare occupations are the fastest growing in Richmond.

Jobs by Occupation in Richmond (2021) and Jobs Growth (2010-2021)



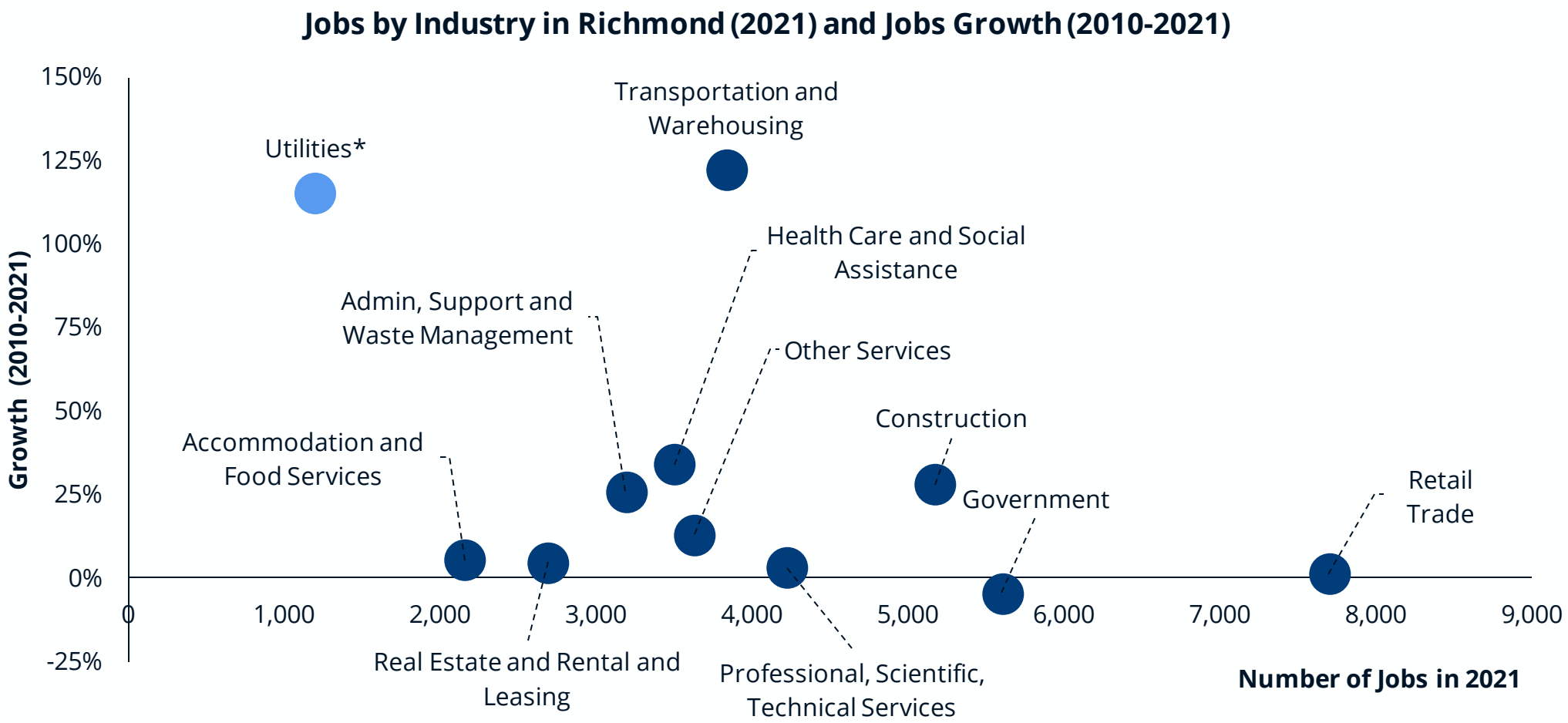
Source: HR&A's analysis of Lightcast data of 23 2-digit SOC occupations. .

After Taxi Drivers, top growing occupations include Health Care Aides, Managers, Cashiers, and Business Operations Specialists.



Source: HR&A's analysis of Lightcast data, out of 867 5-digit SOC occupations.

After Retail Trade, the largest industries in Richmond by employment are Government and Construction. Transportation & Warehousing and Utilities are the fastest growing industries.



Source: HR&A's analysis of Lightcast data, top 10 by number of jobs out of 21 2-digit NAICS industries. *Not in top 10 but added for relevance.

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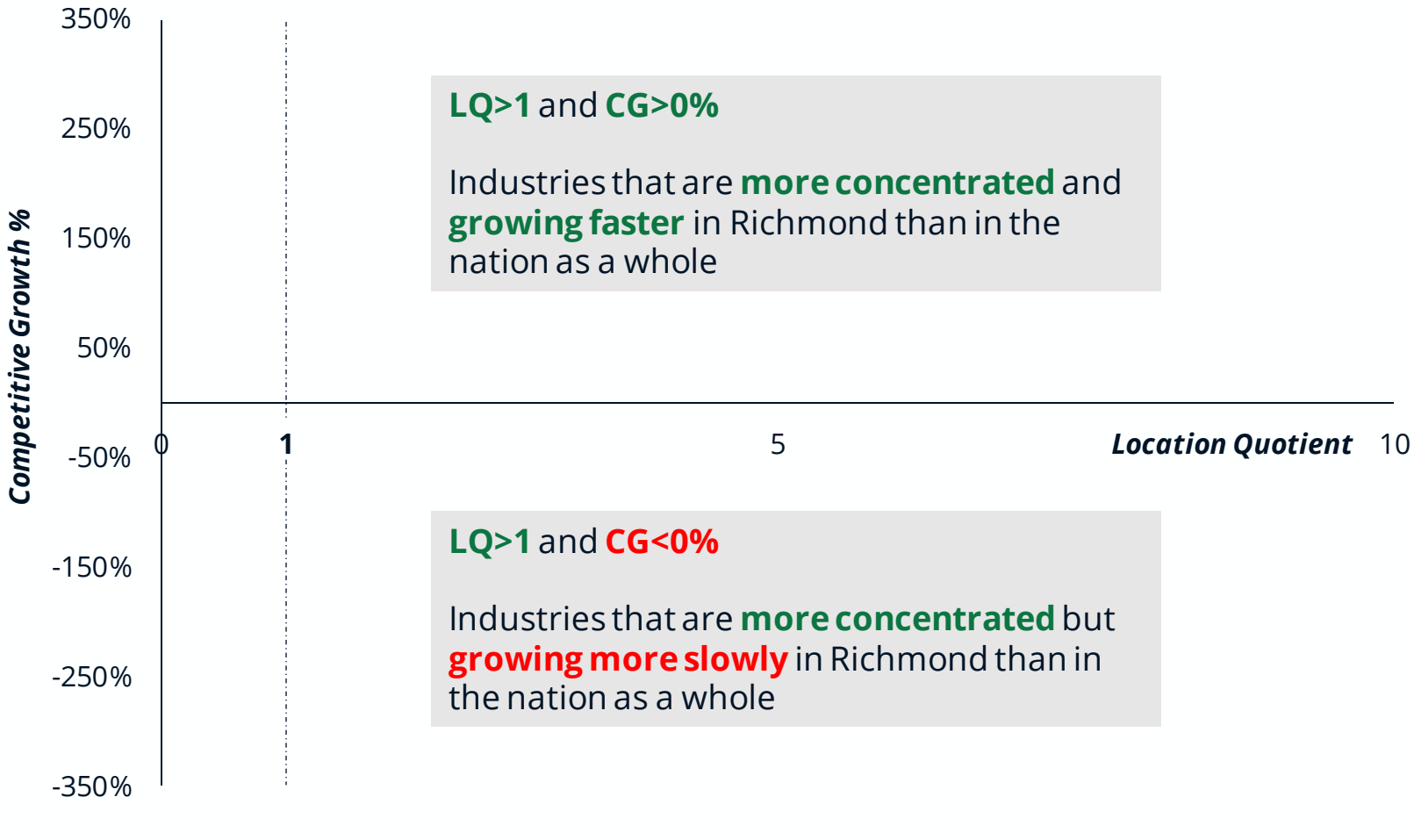

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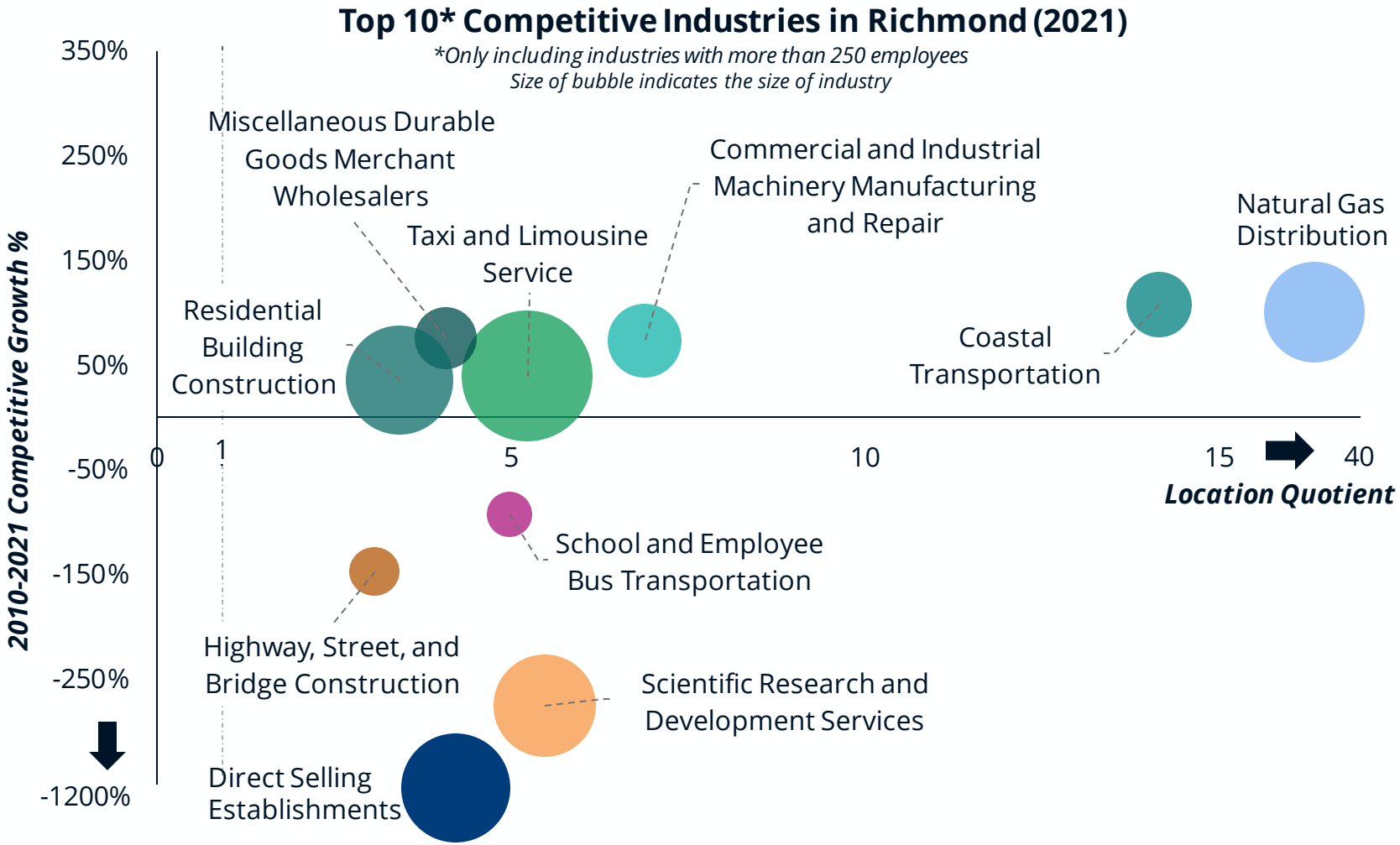

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Source: HR&A's analysis of Lightcast data.

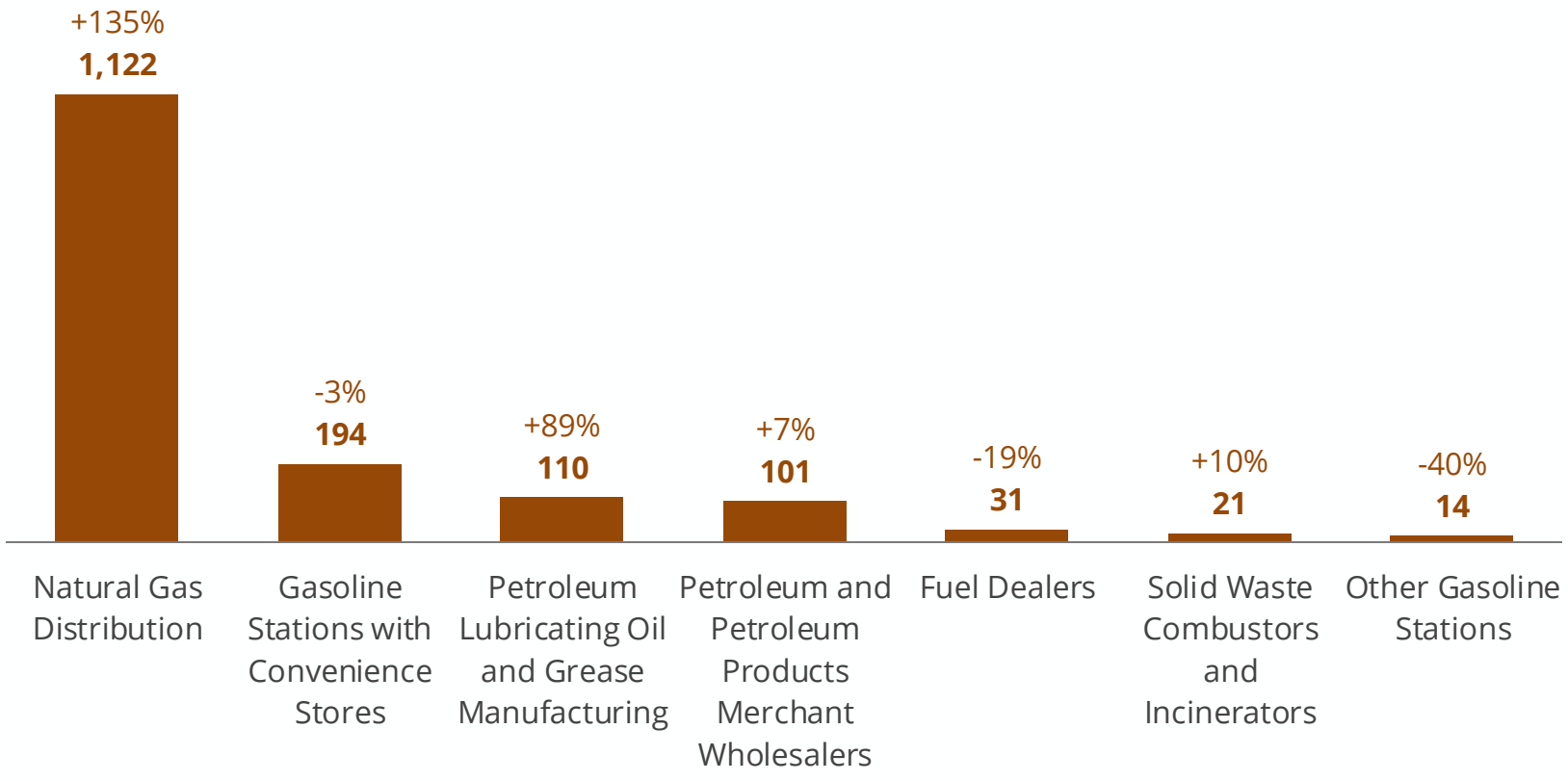
Federal data shows 1,600 local jobs in fossil fuel industries, a 44% increase since 2010. This number does not include jobs within supporting divisions of large fossil fuel companies like Chevron, or supporting businesses in other industries.

Largest Employer in Richmond (2021)

Chevron

3,264 Total Employees

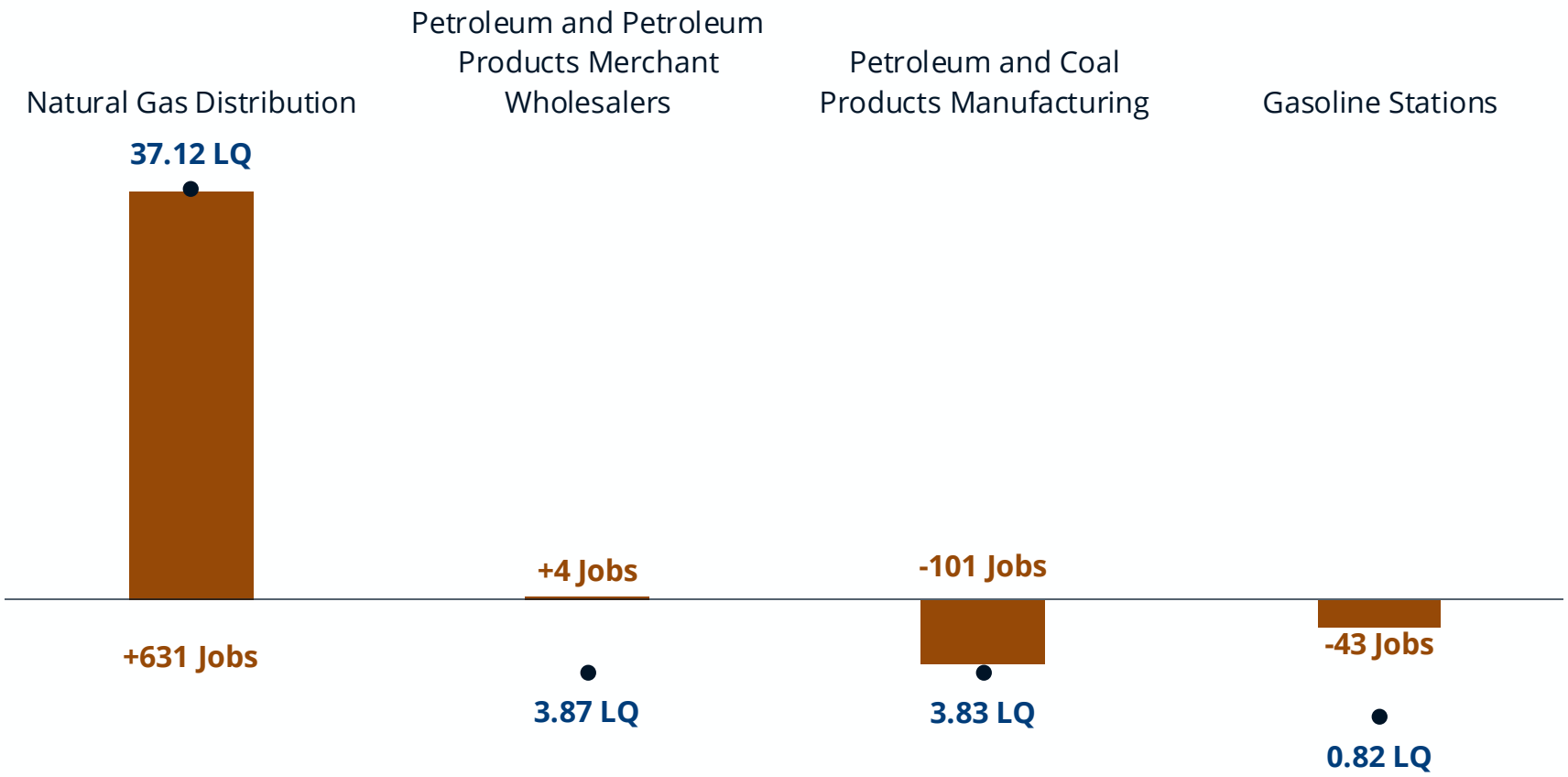
Extractive Industry Jobs in Richmond (2021) with Change in Jobs (2010-2021)



Source: HR&A's analysis of Lightcast data and City of Richmond data.

Natural Gas Distribution, Petroleum Products Wholesalers, and Petroleum Products Manufacturing, all have very high location quotient in Richmond.

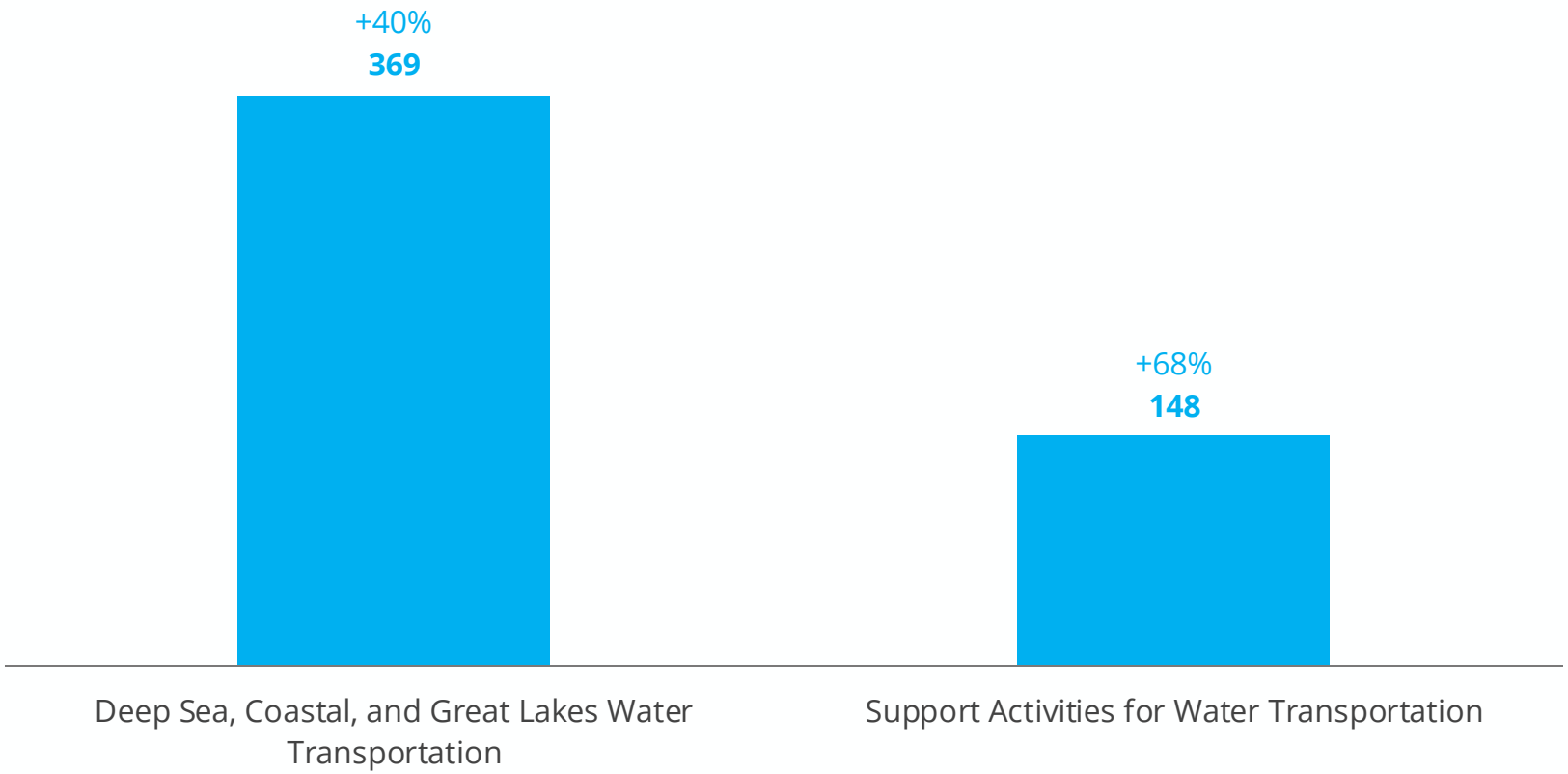
Richmond's Fossil Fuel Industry Cluster LQs (2021) and Number of Jobs Gained/Lost due to Competitive Factors (2010-2021)



Source: HR&A's analysis of Lightcast data.

Richmond has over 500 jobs in Water Transportation, including support activities for water transportation, experiencing significant growth over the last decade.

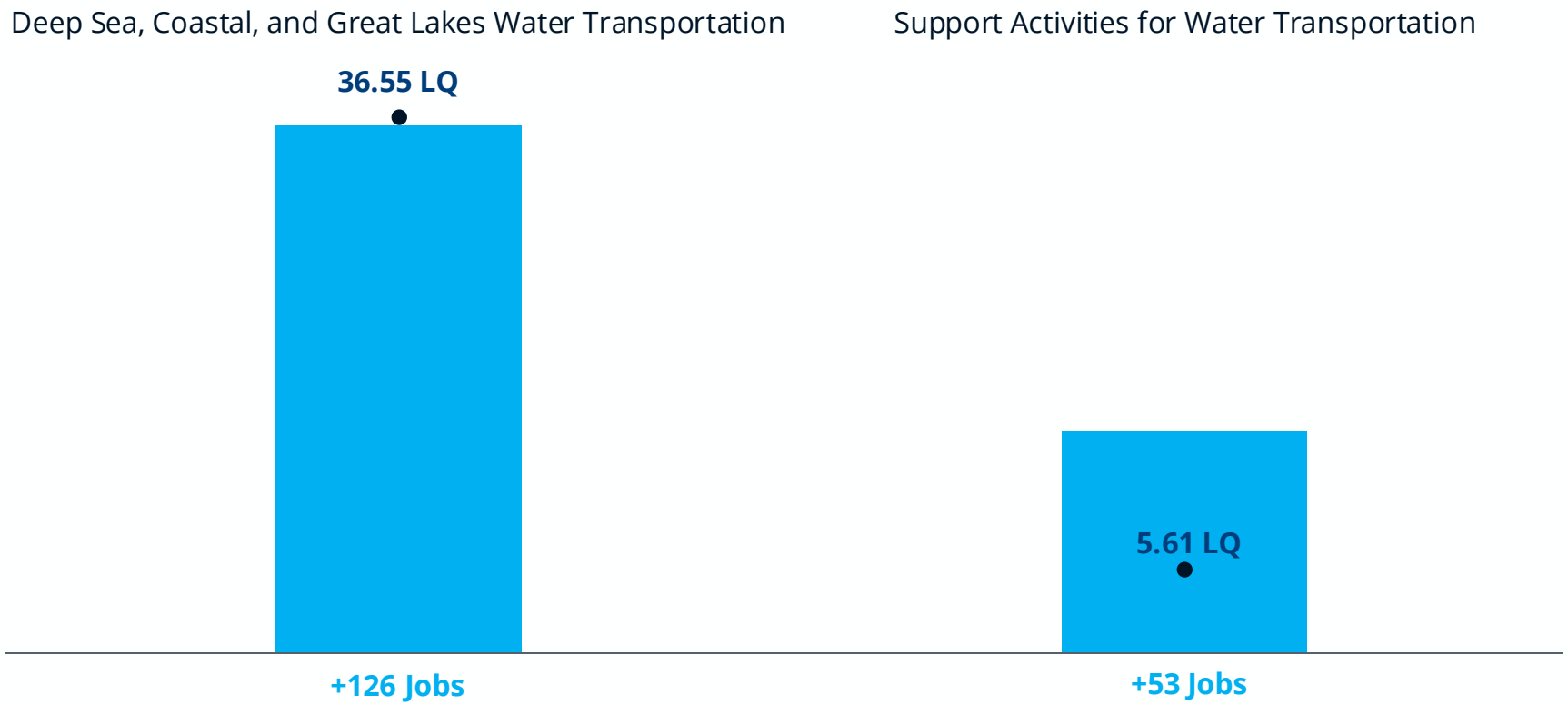
Water Transportation Jobs in Richmond (2021) with Change in Jobs (2010-2021)



Source: HR&A's analysis of Lightcast data.

Water Transportation overall has one of the highest location quotients in Richmond and has grown over the last decade due to competitive advantages.

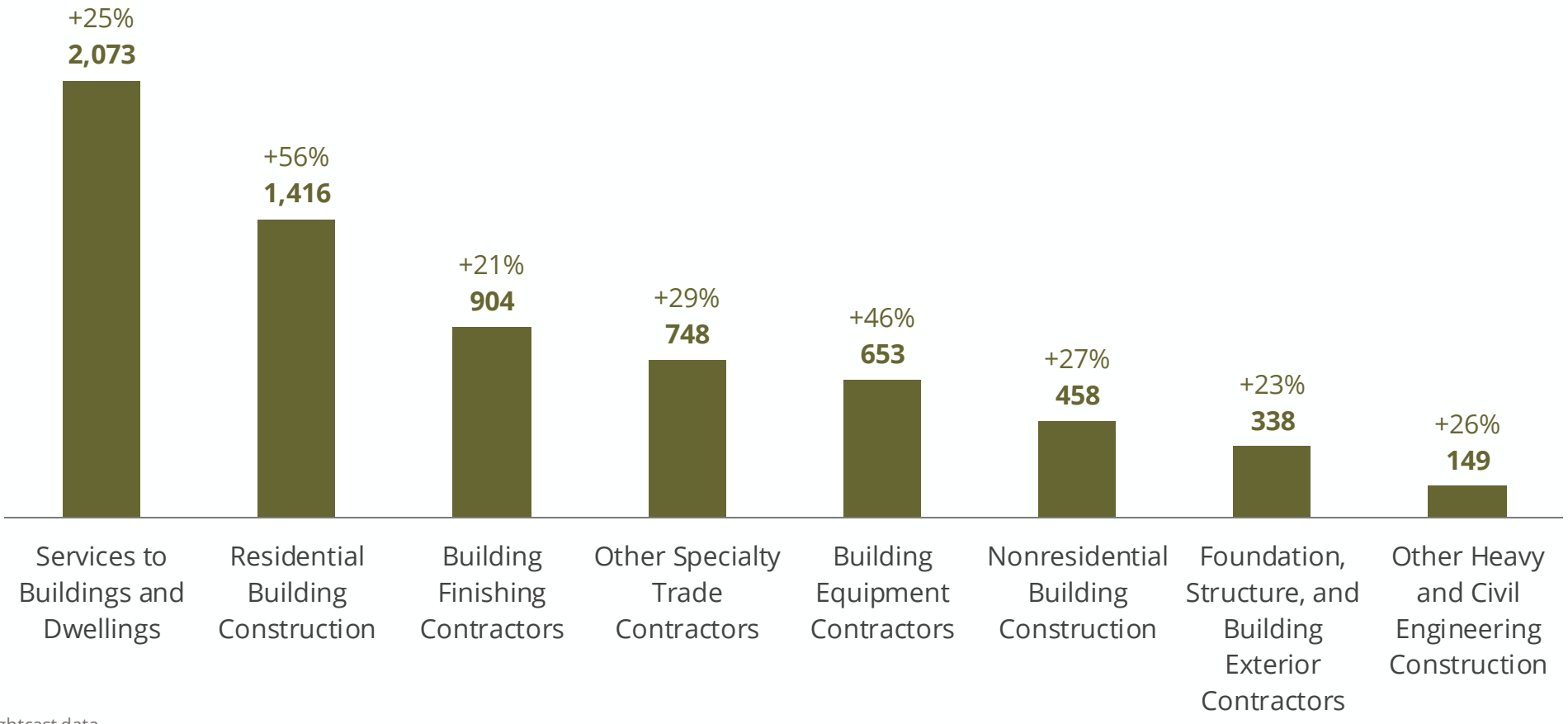
Richmond's Water Transportation Cluster LQs (2021) and Number of Jobs Gained due to Competitive Factors (2010-2021)



Source: HR&A's analysis of Lightcast data.

Richmond has 6,700+ jobs in building, construction, and related service industries, all of which have grown over the last decade.

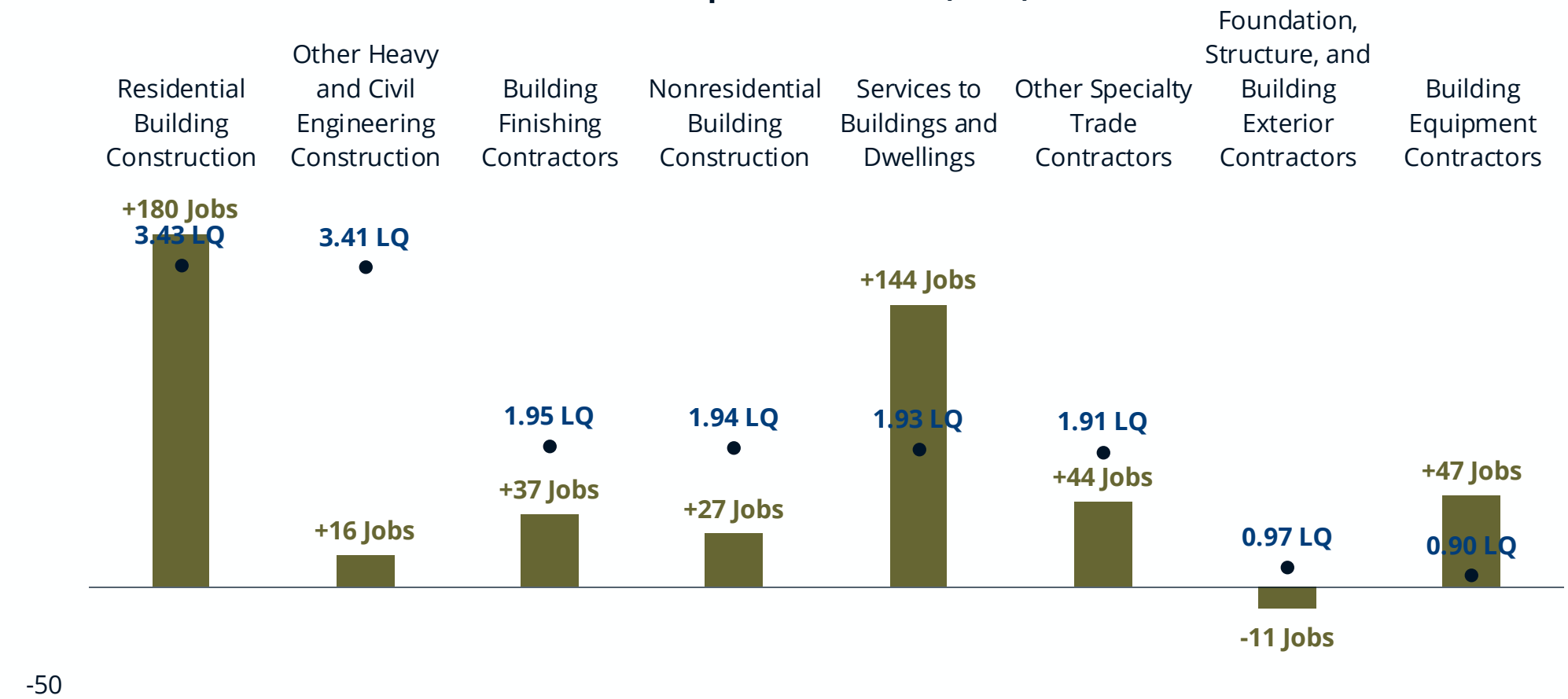
Building, Construction and Service Jobs in Richmond (2021) with Change in Jobs (2010-2021)



Source: HR&A's analysis of Lightcast data.

Residential Construction and Services to Buildings have gained significant number of jobs over the last decade due to competitive factors.

Richmond's Building, Construction, and Service Cluster and Number of Jobs Gained/Lost due to Competitive Factors (2021)



Source: HR&A's analysis of Lightcast data.

Key Takeaways

1. Richmond has approximately 51,000 total jobs.

2. Almost one-half of Richmond's workforce is employed in one of its top three sectors: industrial, and professional service, and retail.

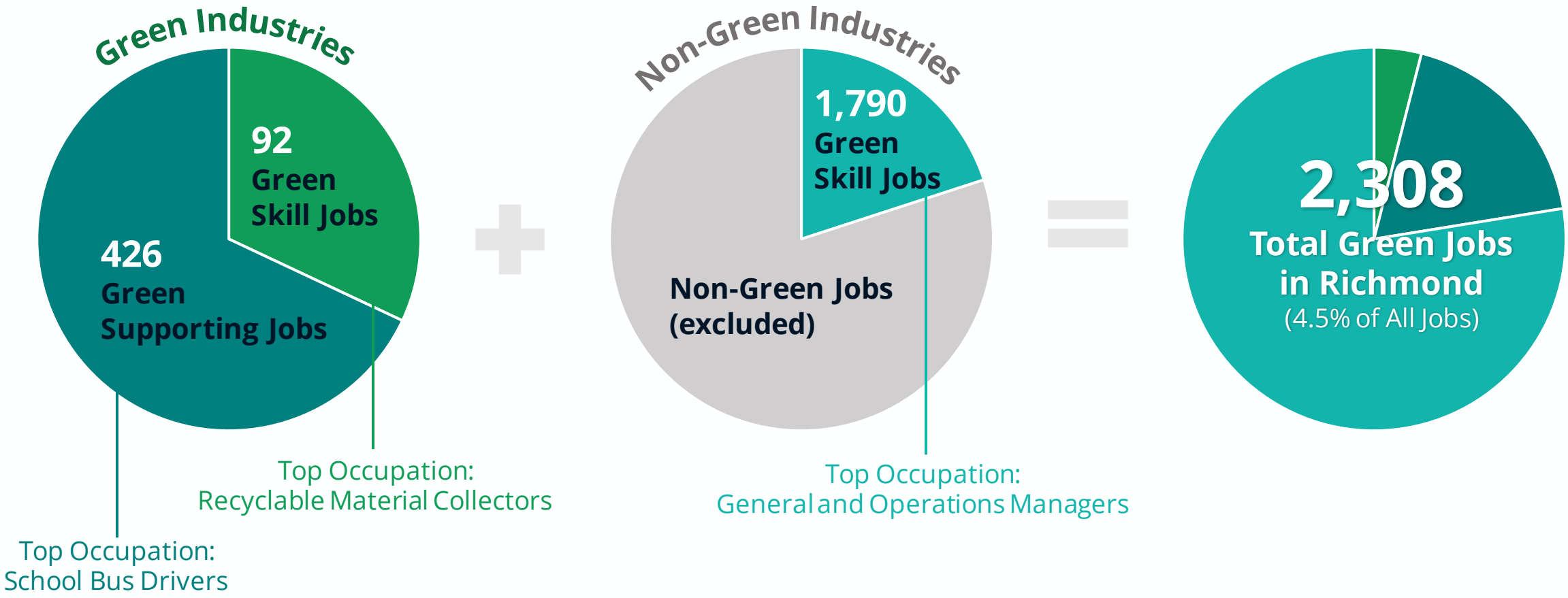
3. Richmond's key sectoral strengths relate to utilities, water transportation, building construction, machinery repair/maintenance industries, and research & development.

4. Richmond's key industries point toward opportunities for the creation of high-road Green Jobs.

RICHMOND'S GREEN JOBS TODAY

GREEN JOBS | TOTALS

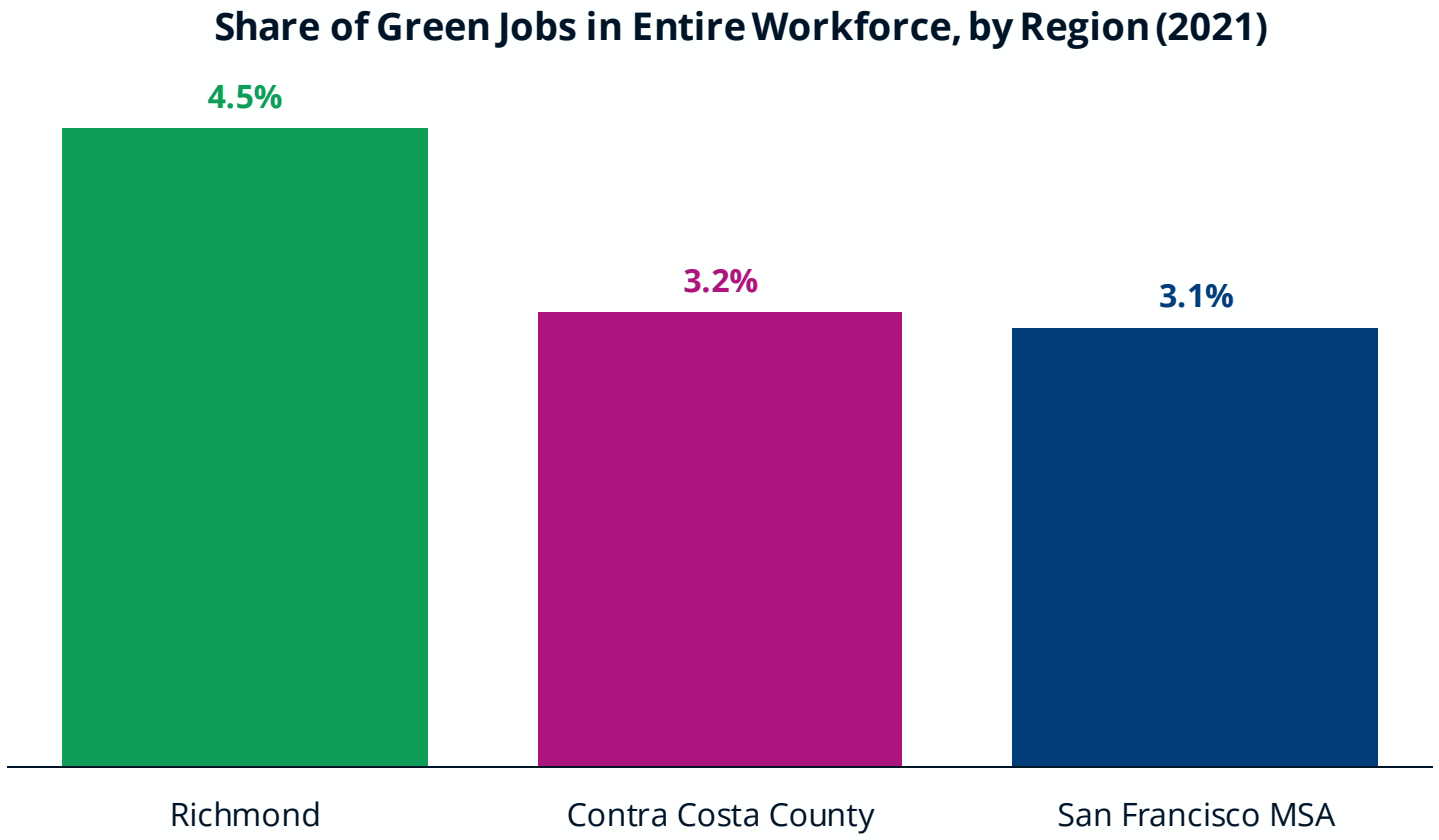
Today, Richmond's economy includes approximately 2,308 Green Jobs across both green (22%) and non-green (78%) industries. Further, 82% Green Jobs require specialized Green Skills, while the other 18% are supporting jobs in green industries.



Source: HR&A's analysis of Lightcast data. Diagram not to scale.

REGIONAL COMPARISON

Richmond has a greater share of its workforce employed in Green Jobs compared to both the Contra Costa County and the entire MSA.

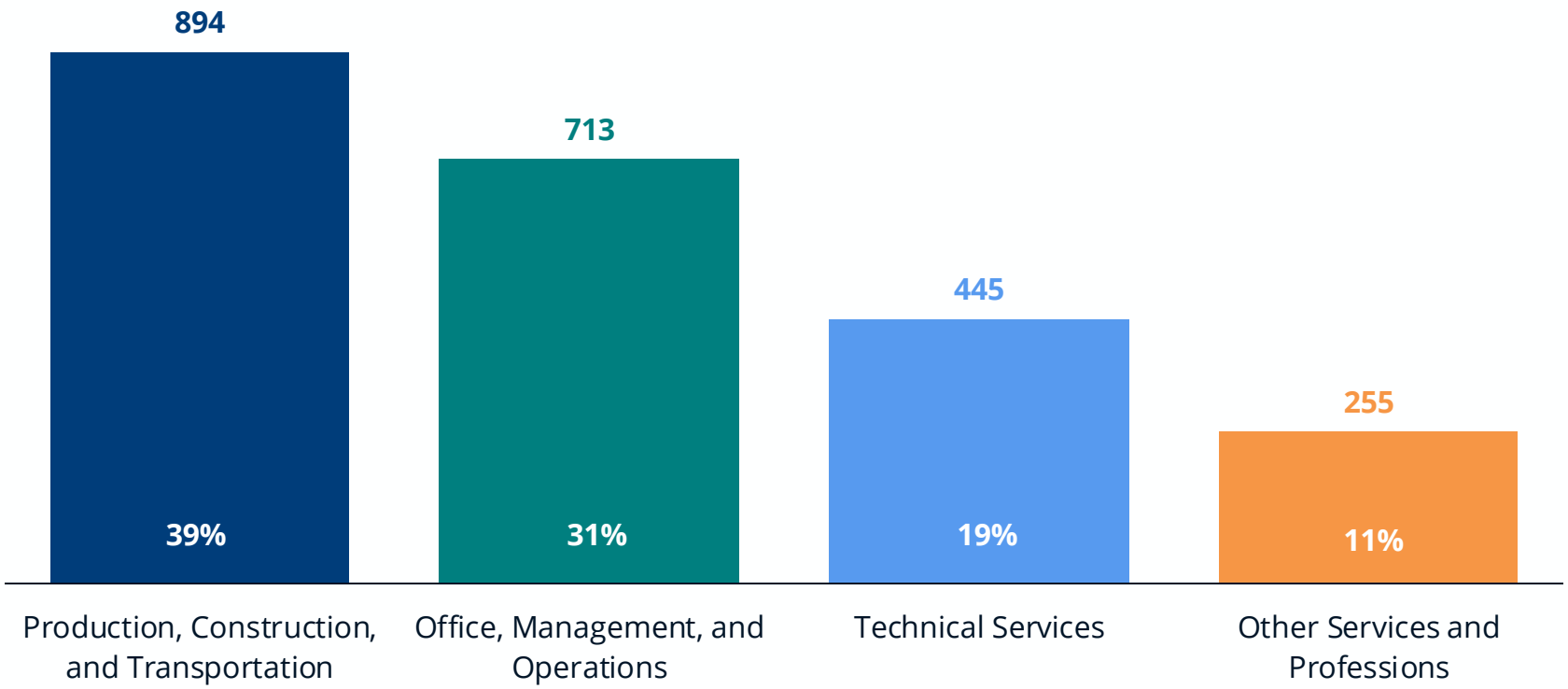


Source: HR&A's analysis of Lightcast data.

GREEN JOBS TODAY

Almost 40% of Green Jobs fall under Production, Construction, and Transportation occupations, followed by 31% in Office, Management, and Operations occupations.

Green Jobs by Occupational Groups in Richmond (2021)

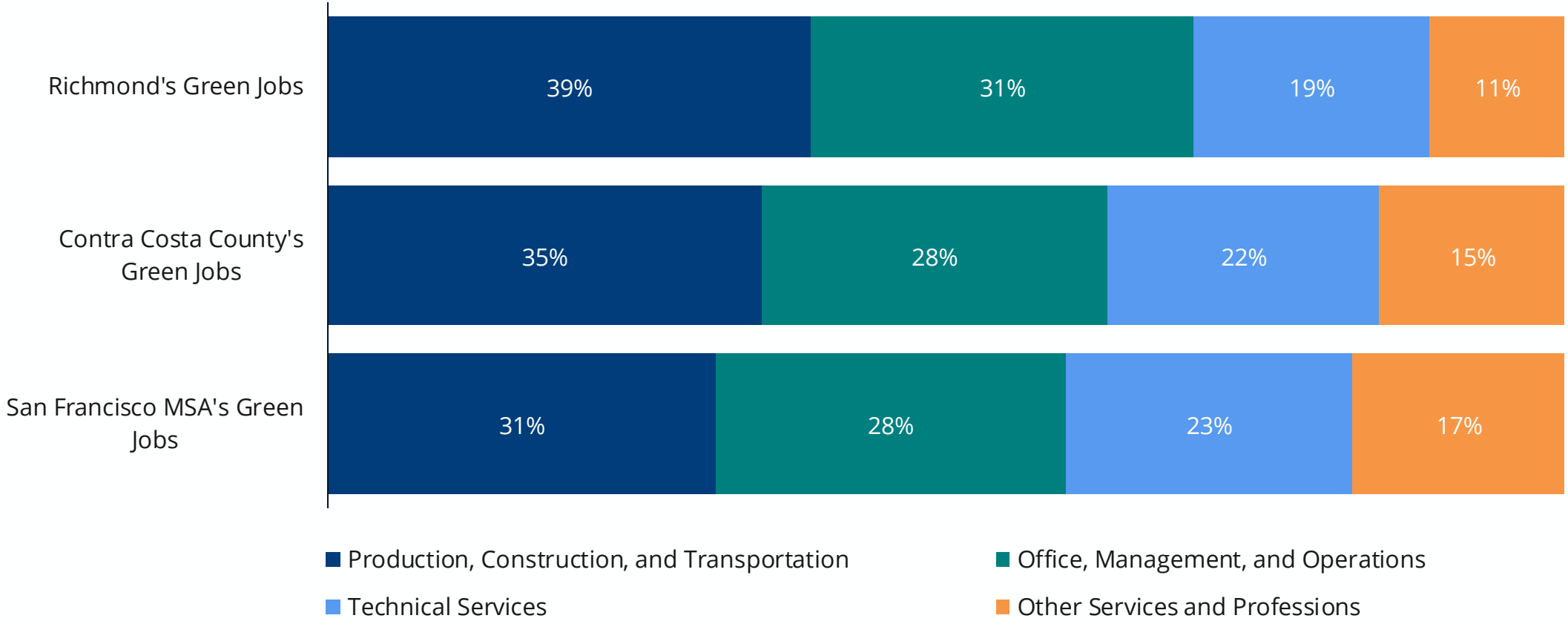


Source: HR&A's analysis of Lightcast data.

GREEN JOBS | OCCUPATION CATEGORIES

In Richmond, 39% of Green Jobs are in Production, Construction, and Transportation occupations, whereas in surrounding areas, Green Jobs are more evenly divided between occupation categories.

Green Jobs by Occupation Group, by Region (2021)

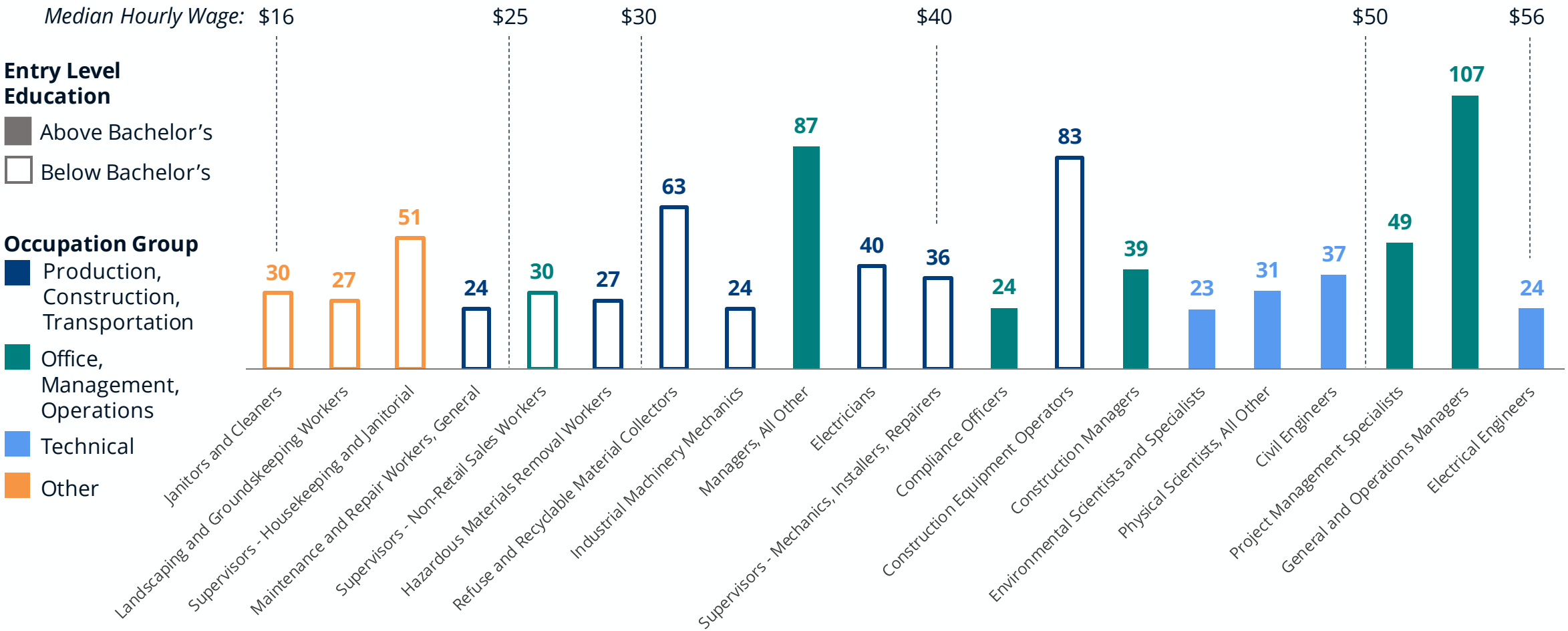


Source: HR&A's analysis of Lightcast data.

GREEN JOBS | TOP OCCUPATIONS

Managers (General and Operations Managers and All Other) is the largest Green Skill occupation, constituting 194 jobs or 8.4% of all Green Jobs in Richmond.

Green Jobs in Top 20 Occupations for Green Skill Jobs in Richmond (2021)

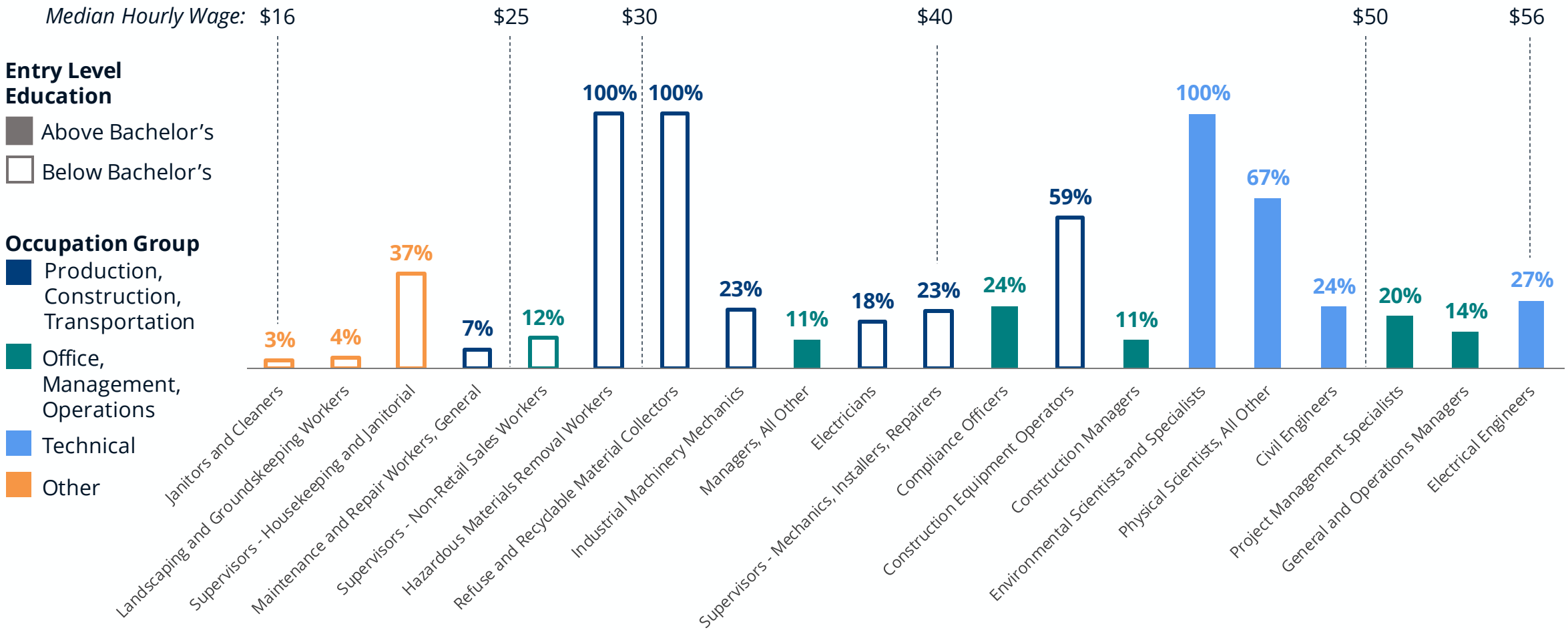


Source: HR&A's analysis of Lightcast data, out of 867 5-digit SOC occupations.

GREEN JOBS | TOP OCCUPATIONS

In some occupations like environmental scientists and recycling collectors, all jobs require Green Skills. In most other occupations, only a portion of jobs require Green Skills.

Share of Green Jobs in Top 20 Occupations for Green Skill Jobs in Richmond (2021)

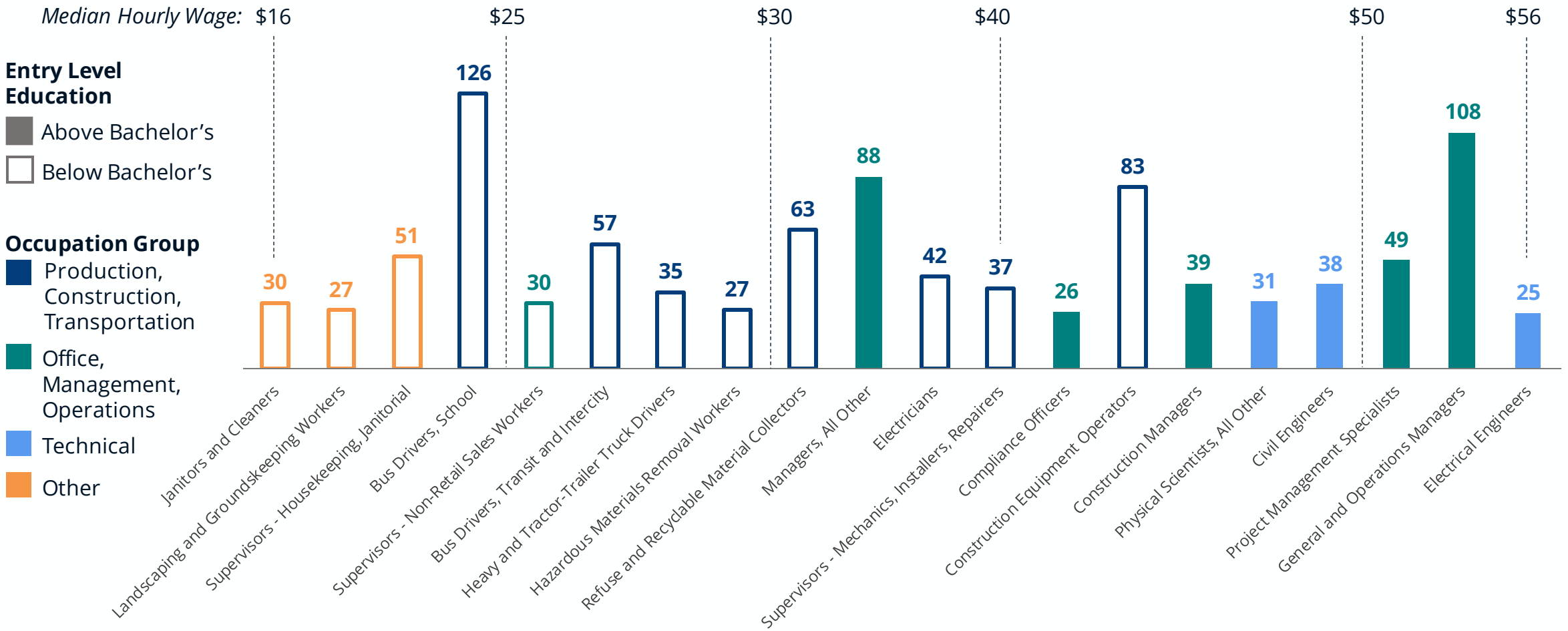


Source: HR&A's analysis of Lightcast data, out of 867 5-digit SOC occupations.

GREEN JOBS | TOP OCCUPATIONS

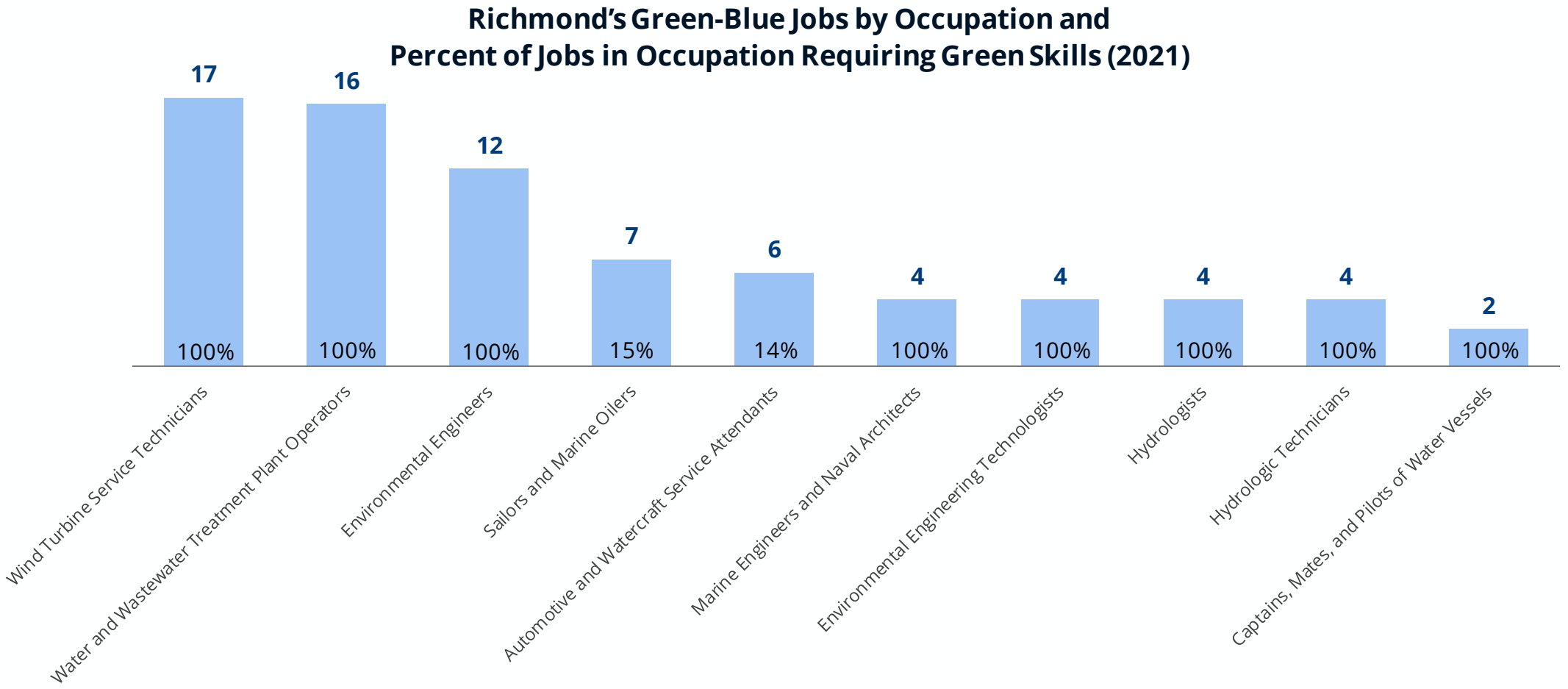
The top 20 occupations constitute 44% of all Green Jobs in Richmond, and only 8 require education above a B.A.

Number of Green Jobs in Top 20 Occupations for Green Jobs in Richmond (2021)



Source: HR&A's analysis of Lightcast data, out of 867 5-digit SOC occupations.

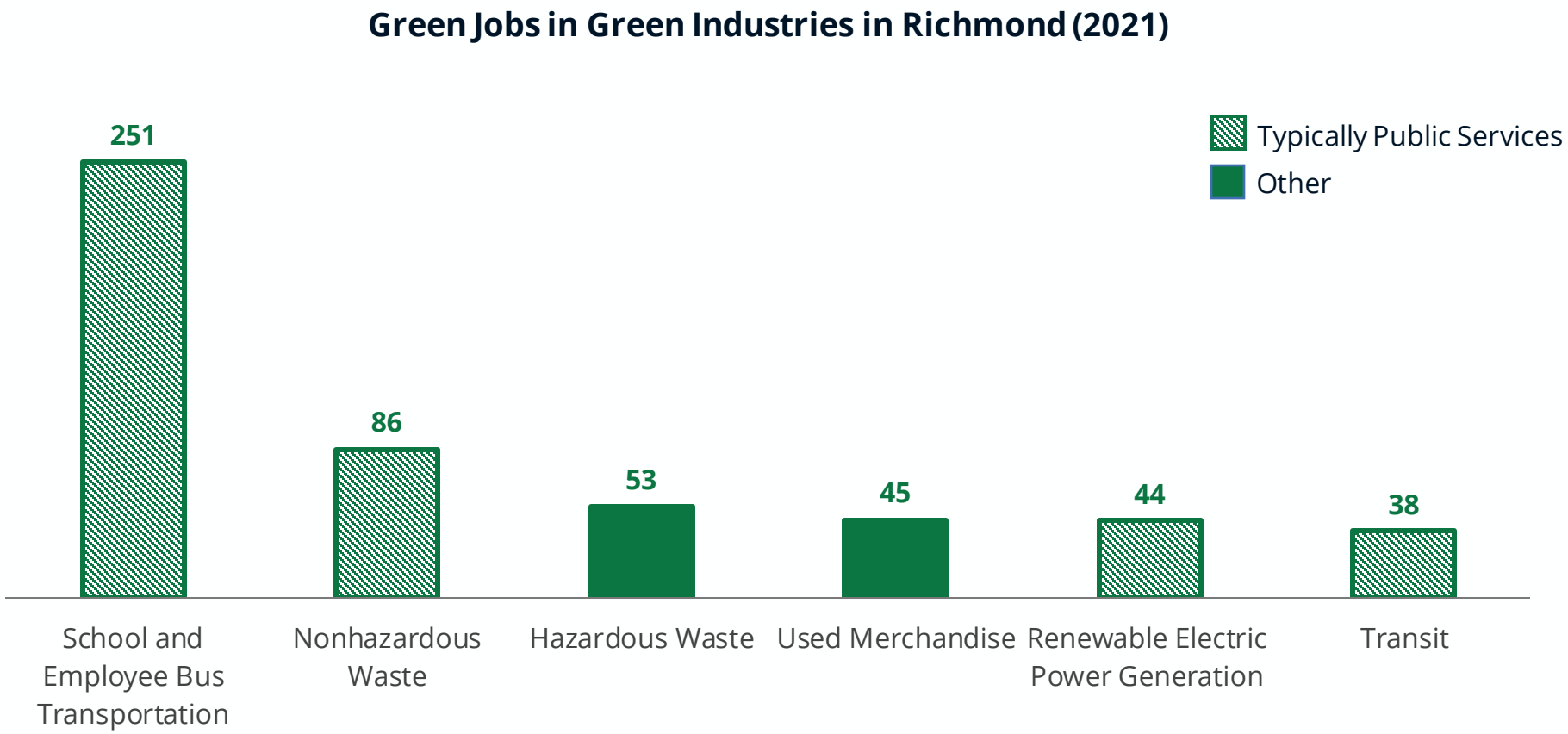
There are 77 jobs in Richmond readily identifiable as "Green-Blue Jobs", comprising 3% of all Green Jobs. These jobs require Green Skills and are in occupations that are significantly involved in the blue economy.



Source: HR&A's analysis of analysis of 50,781 job postings from 2017-2021 through Lightcast, out of 867 5-digit SOC occupations.

GREEN JOBS TODAY

Among green industries, School and Employee Bus Transportation make up 49% of Green Jobs, followed by Nonhazardous Waste (17%), and Hazardous Waste (10%).



Source: HR&A's analysis of Lightcast data.

GREEN JOBS | TOP-HIRING EMPLOYERS

Veolia, Republic Services, Schnitzer Steel, Cascade Environmental, and ICF International are actively hiring the greatest number of Green Skill Jobs in Richmond.

VEOLIA ENVIRONMENTAL SERVICES

Examples: Wastewater Operators, Collections Technicians, Maintenance Technicians

CASCADE

Examples: Driller Assistants, Drillers, Field Assistants

Schnitzer

Examples: Customer Service Advisors, Production Crews, Vehicle Purchasing Agents

REPUBLIC SERVICES

Examples: Recycling Truck Drivers, Transfer Drivers, Landfill Heavy Equipment Operators

ICF

Examples: Environmental Chemists, Data Validation Specialists, Chemistry Laboratory Technicians

Source: HR&A's analysis of Lightcast data. Examples represent the top green skill job titles at each company by number of postings in recent years.

GREEN JOBS | TOP SKILLS

Green Jobs in Richmond most often require Management, Communications, and Operations Skills in addition to Green Skills such as Environmental Health & Safety.

Top 5 Skills in Jobs Requiring Green Skills

Where size of bubbles represents relative occurrence of these skills.

Top 5 Green Skills in Green Jobs

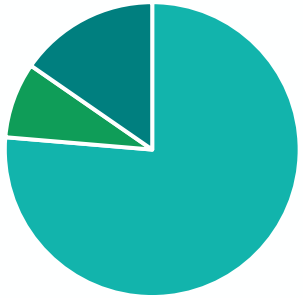
Where size of bubbles represents relative occurrence of these skills.

Source: HR&A's analysis of Lightcast data.

Many Green Jobs demand common non-Green Skills such as communication and management, meaning many workers are already partially qualified to work in Green Jobs.

Green Skill Jobs and Supporting Jobs

in both green and non-green industries

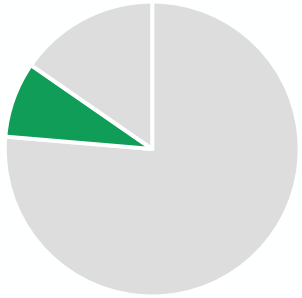


The top skills listed across all Green Job postings include communications, management, and operations. Additional skills include customer service, leadership, writing, and planning. This indicates that many professionals may be able to readily be employed in Green Jobs despite preconceived notions about the prerequisites.

Sample Green Job Titles Posted in Richmond: General Managers, Production Supervisors, Research Associates, Project Managers, Maintenance Supervisors

Green Skill Jobs

in green industries

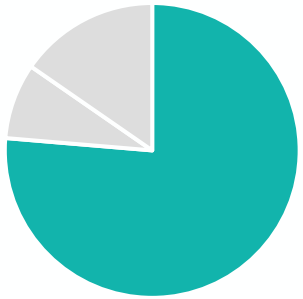


Some Green Skill Jobs call for environmentally-specific skills like data compilation, environmental planning, or wastewater operator certification.

Sample Green Job Titles Posted in Richmond: Laboratory Technicians, Chemical Process Operators, Field Assistants, Project Engineers, Environmental Chemists

Green Skill Jobs

in non-green industries



Finally, in non-green industries, many workers may develop Green Skills that they use during some parts of their job. For instance, construction and operations are both frequently listed in green skill job postings – many construction professionals have transferrable skills that can be used in Green Jobs.

Sample Green Job Titles Posted in Richmond: Operator Helpers, Maintenance Technicians, Drillers, Recycling Truck Drivers, Production Crews, Warehouse Receivers, Vehicle Maintenance

Source: HR&A's analysis of Lightcast data.

Key Takeaways

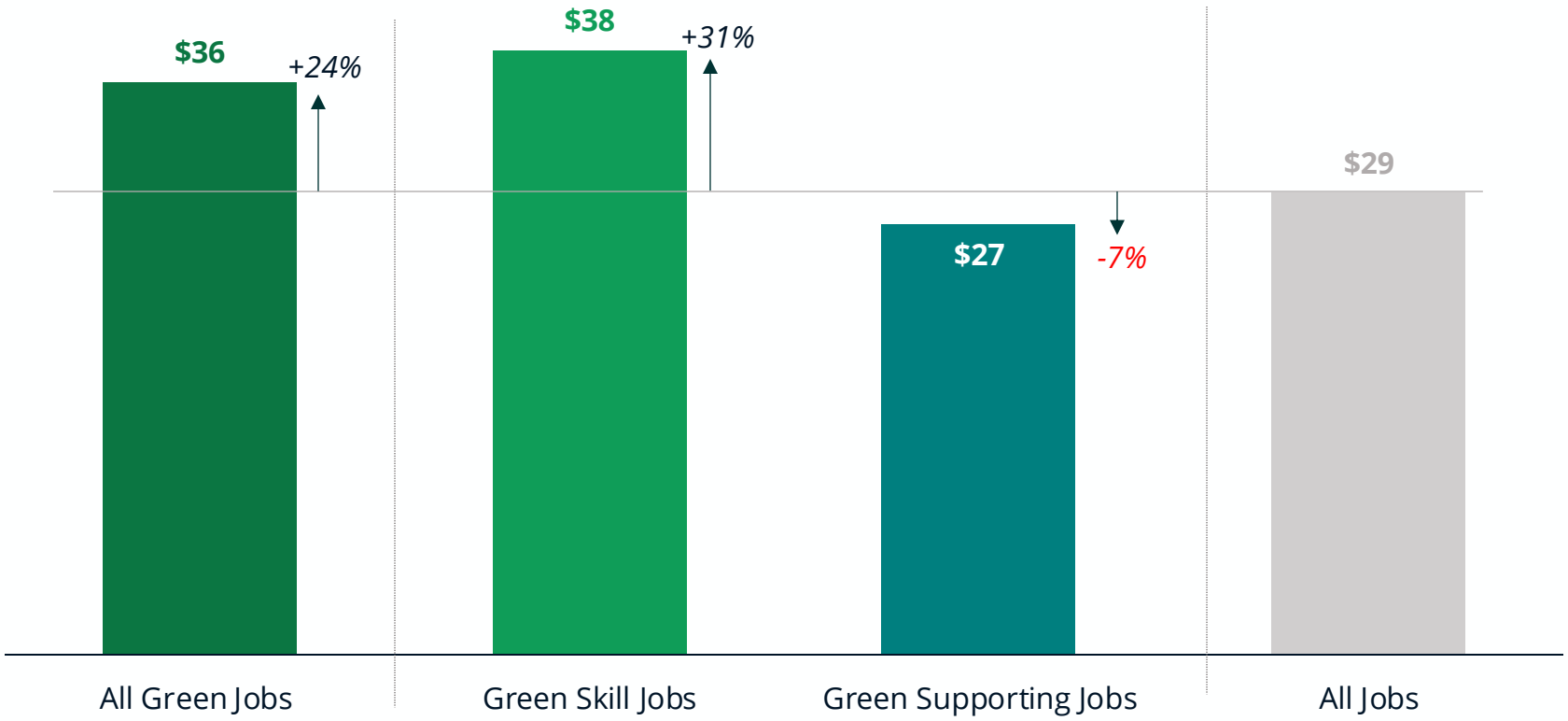
1. There are almost 2,300 Green Jobs in Richmond, meaning more than one in every 22 jobs requires Green Skills, is in a green industry, or both.
2. Forty percent of Green Jobs are in Production, Construction, and Transportation occupations, which typically do not require a college degree, but also tend to pay less than the average job.
3. A large proportion of Green Jobs in Richmond are in providing public services, such as school transportation, public transit, and waste collection/disposal.
4. Richmond companies actively hiring for Green Skills include those providing environmental remediation services; recycling metals; and selling environmentally friendly food and other consumer products.
5. The most commonly sought-after Green Skills are related to environmental health and safety, followed by those related to environmental science and regulations.
6. Green jobs also require common non-Green Skills, such as those related to communication, management, and operations.

RICHMOND'S GREEN JOB WAGES

GREEN JOB WAGES

Overall, Green Job workers earn 24% higher wages compared to the average Richmond worker. Within Green Jobs, Green Skill Jobs pay a 31% premium, while wages in Green Supporting Jobs are slightly lower than the overall economy.

Median Hourly Wage of Green Jobs by category in Richmond (2021)

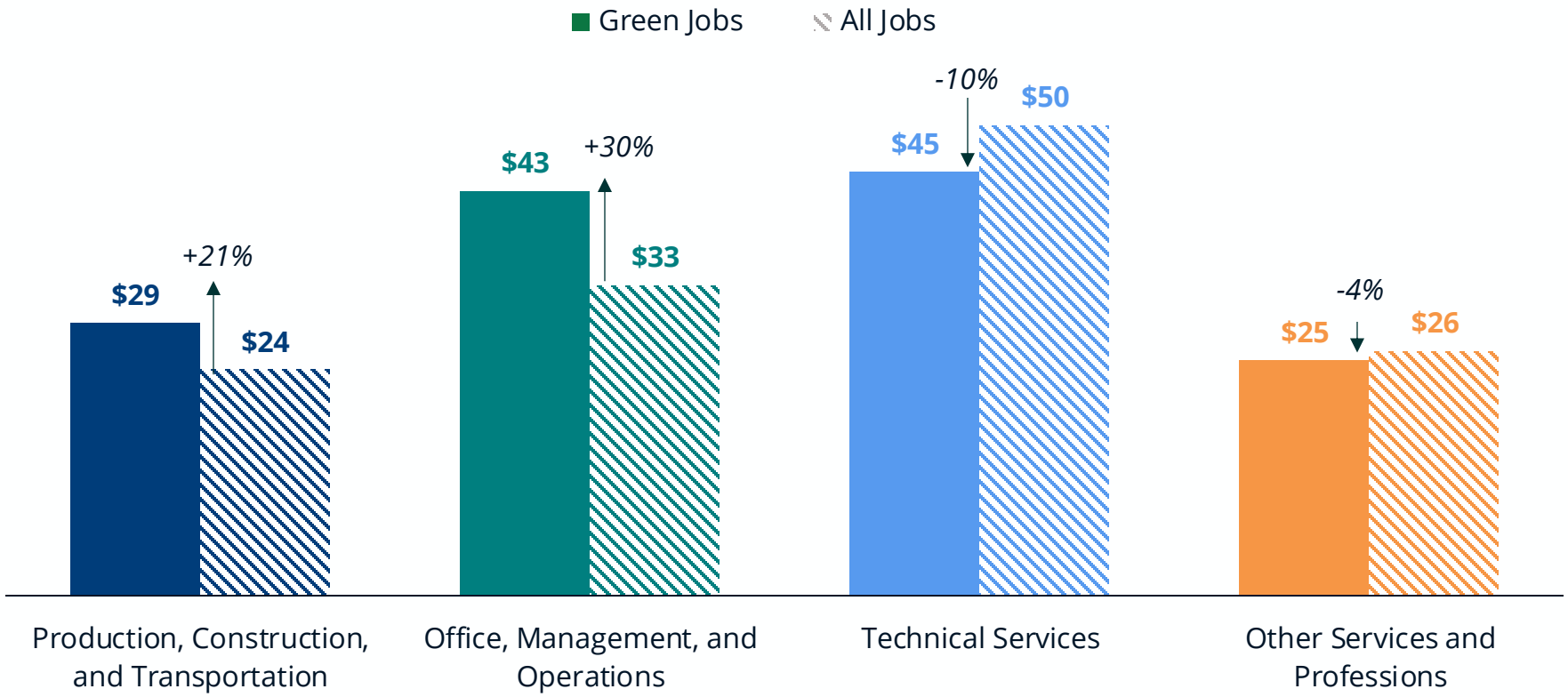


Source: HR&A's analysis of Lightcast data.

GREEN JOB WAGES

Green Jobs in Office, Management, and Operations and Production, Construction, and Transportation pay 1.3 times and 1.2 times that of overall economy, while Green Jobs in Technical Services pay 0.9 times. Green jobs in Other Services & Professions pay at par.

Median Hourly Wage of Green Jobs by Occupational Groups in Richmond (2021)



Source: HR&A's analysis of Lightcast data.

GREEN JOB WAGES

Green Jobs pay higher wages than the overall economy irrespective of the educational attainment, but especially in jobs not requiring a B.A., where Green Jobs pay 17% more. Green Jobs requiring a B.A. or above pay 85% more than ones that don't require a B.A.

Median Hourly Wage of Green Jobs by Educational Attainment in Richmond (2021)

Source: HR&A's analysis of Lightcast data.

Key Takeaways

1. The average Green Job in Richmond pays $36 per hour, 24% higher than the average local job.

2. Green Jobs that require Green Skills tend to pay 41% more than Supporting Green Jobs, which are jobs in Green Industries that don't require Green Skills.

3. For jobs that don't require a college degree, Green Jobs pay a 17% premium ($4 more per hour).

4. Green jobs that require a college degree pay on average 85% more than those that don't—a lower education premium for Green Jobs than for jobs overall.

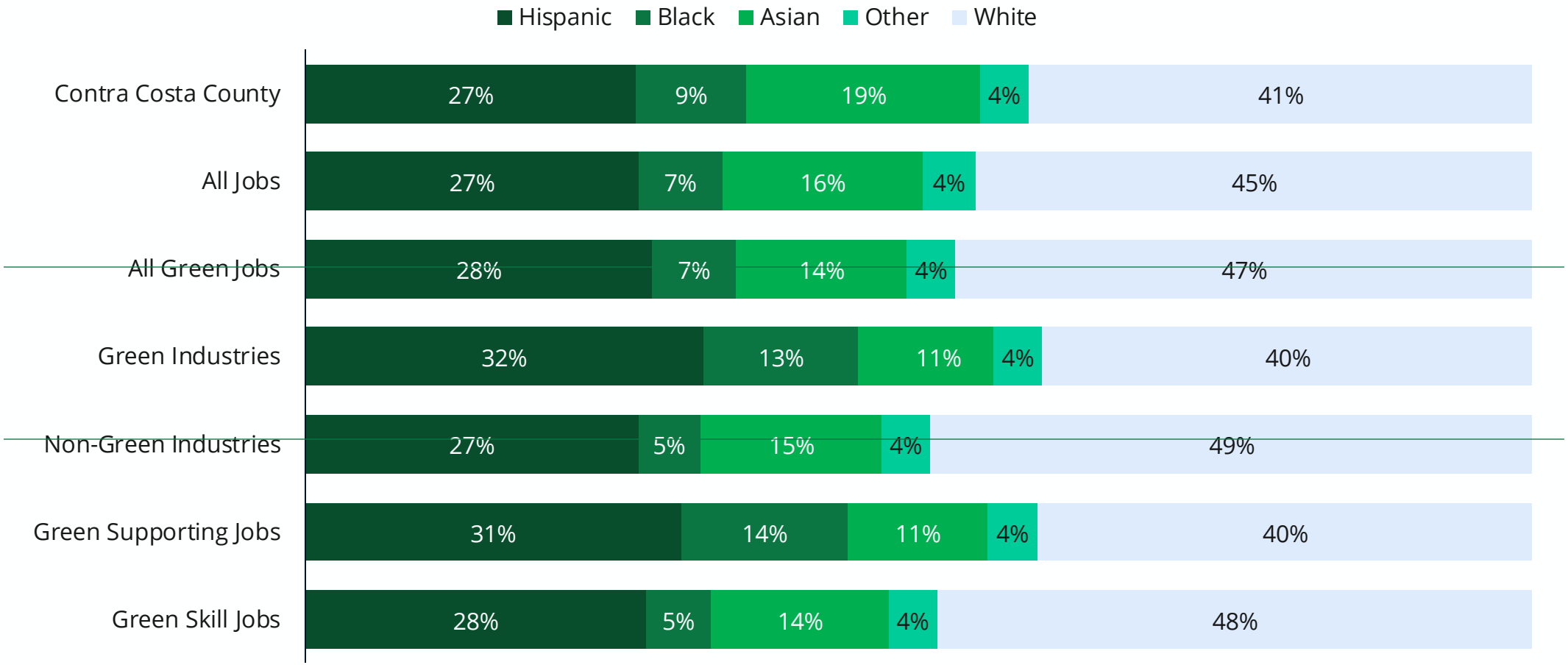
RICHMOND'S

GREEN JOB DEMOGRAPHICS

GREEN JOB DEMOGRAPHICS | RACE & ETHNICITY

Green Jobs are racially representative of Contra Costa County's overall economy but not of its population. Among Green Jobs, Green Supporting Jobs are more diverse than Green Skill Jobs. Similarly, green industries are more diverse than non-green industries.

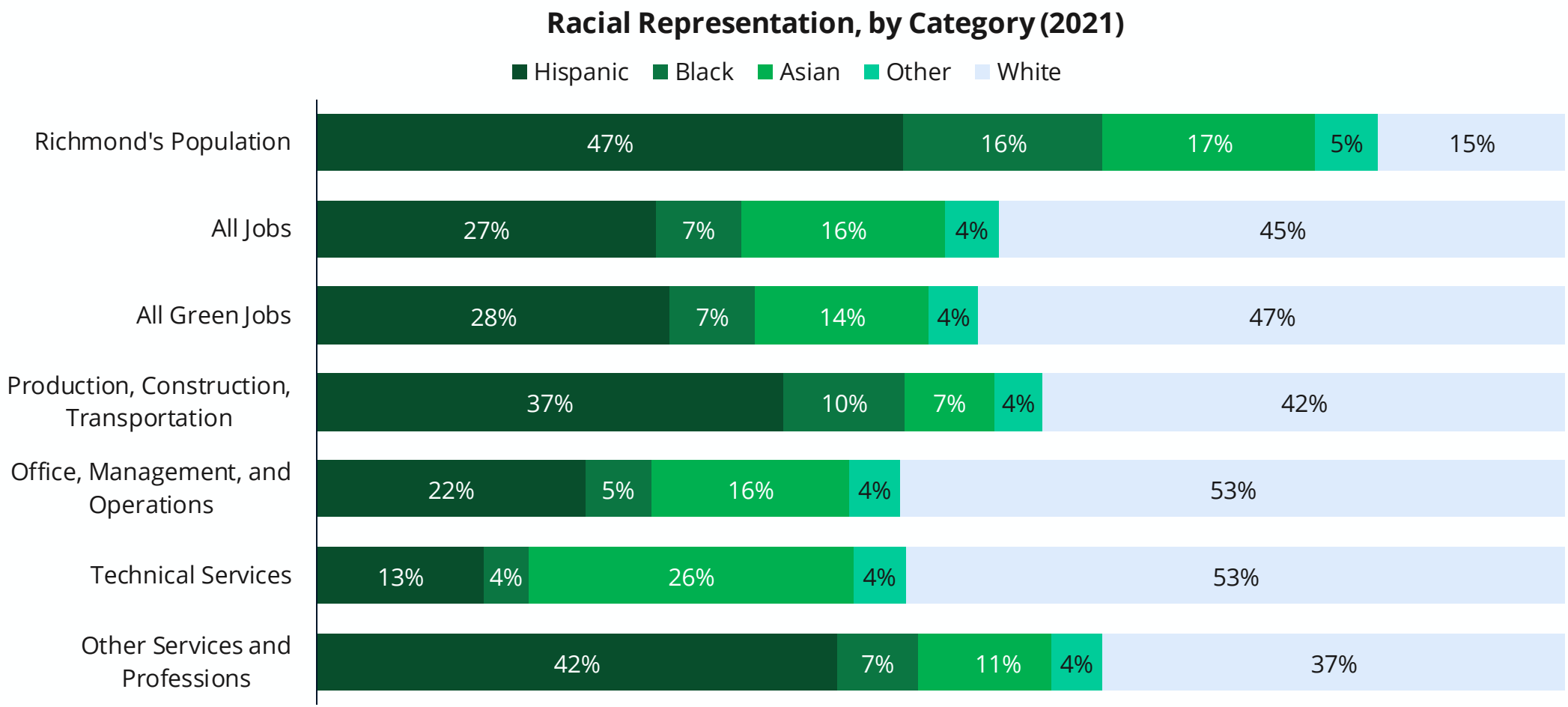
Racial Representation, by Category (2021)



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | RACE & ETHNICITY

Within Green Jobs, Production, Construction, and Transportation and Other Services occupations are more diverse than Office, Management, and Operations and Technical services occupations.

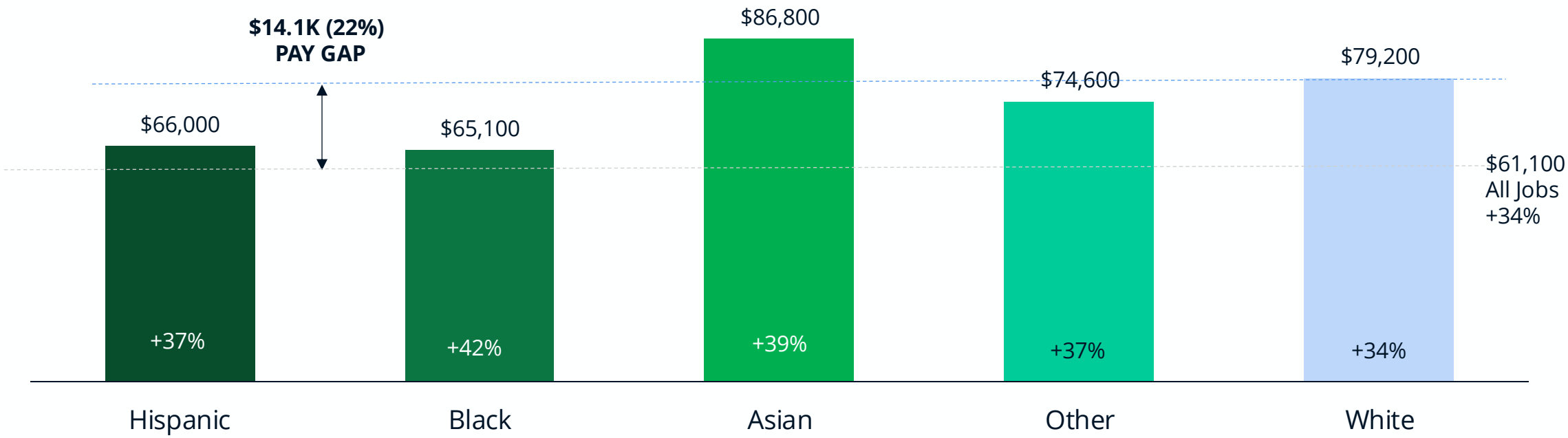


Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | RACE & ETHNICITY

Within Green Jobs, Black and Hispanic workers experience a wage gap of $14.1K compared to their white counterparts. This gap has increased by $0.8K since 2010, but relative wage gap is decreasing due to slightly faster increase in wages for Black and Hispanic workers.

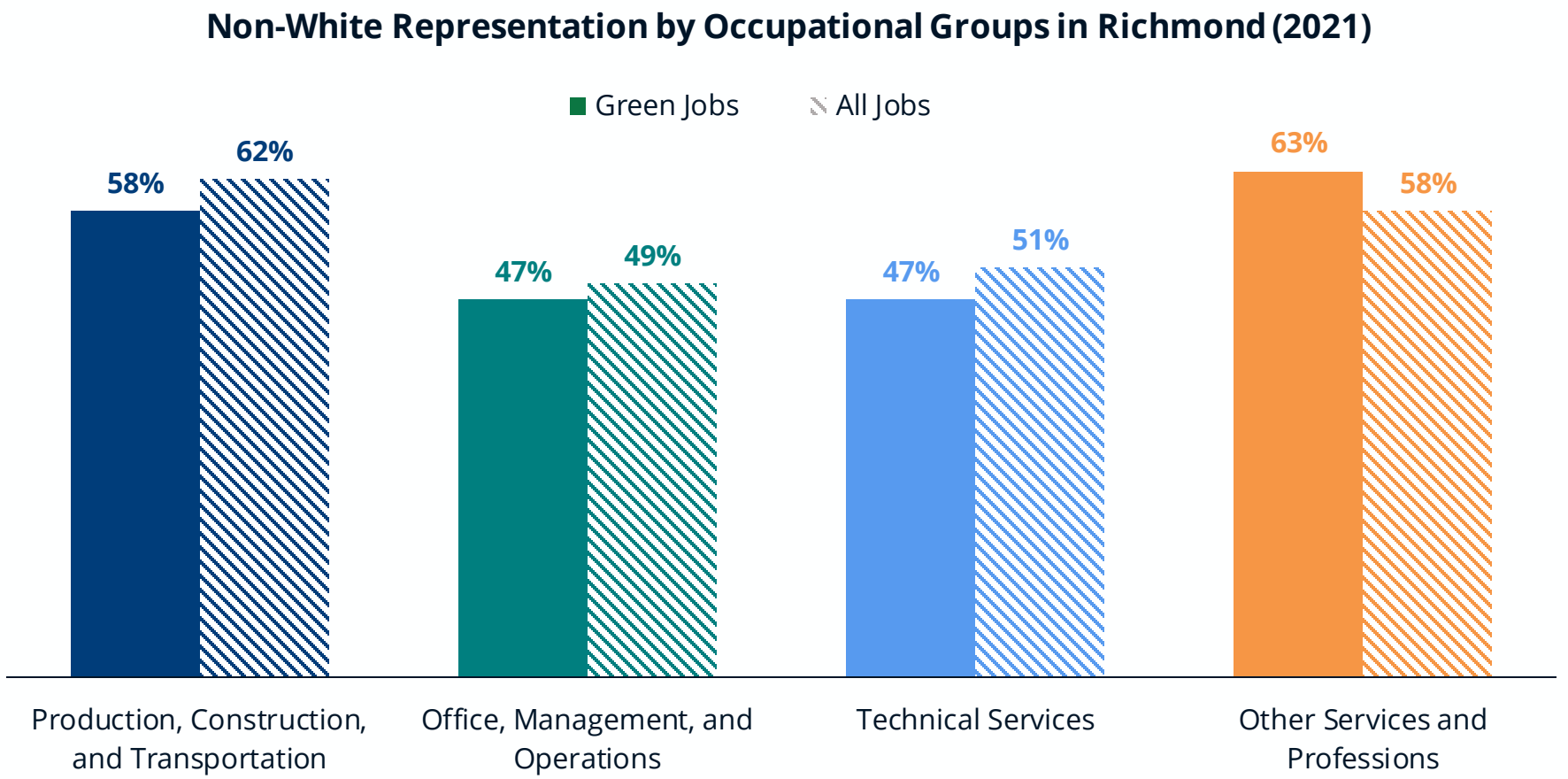
Green Jobs Average Annual Earnings by Race in Richmond (2021)



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | RACE & ETHNICITY

When compared to the overall economy, non-white worker representation in Green Jobs is slightly lower in all occupation groups except Other Services and Professions.

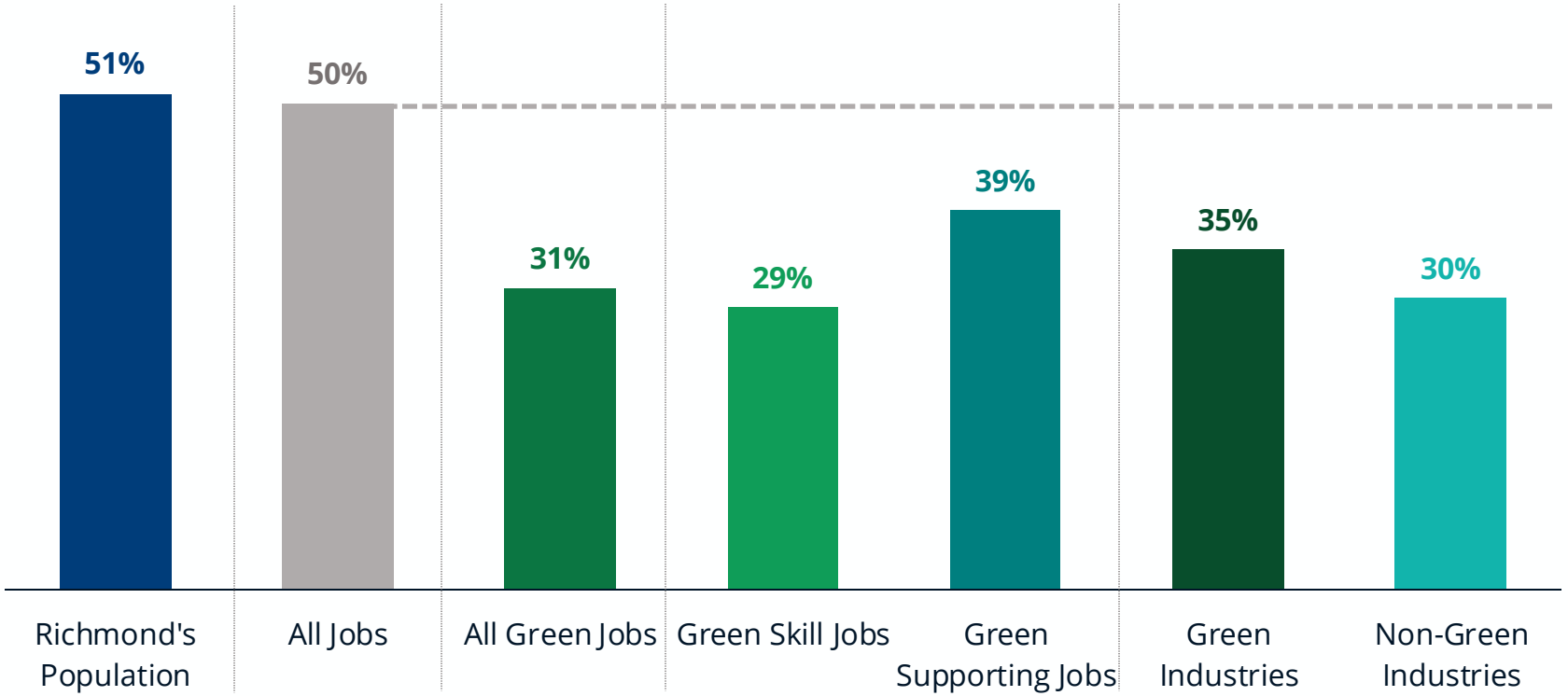


Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | GENDER

Green jobs are predominantly filled by male workers. Among job types, Green Skill Jobs have the lowest female representation. Similarly, non-green industries have lower female representation that green industries.

Female Representation, by Category (2021)

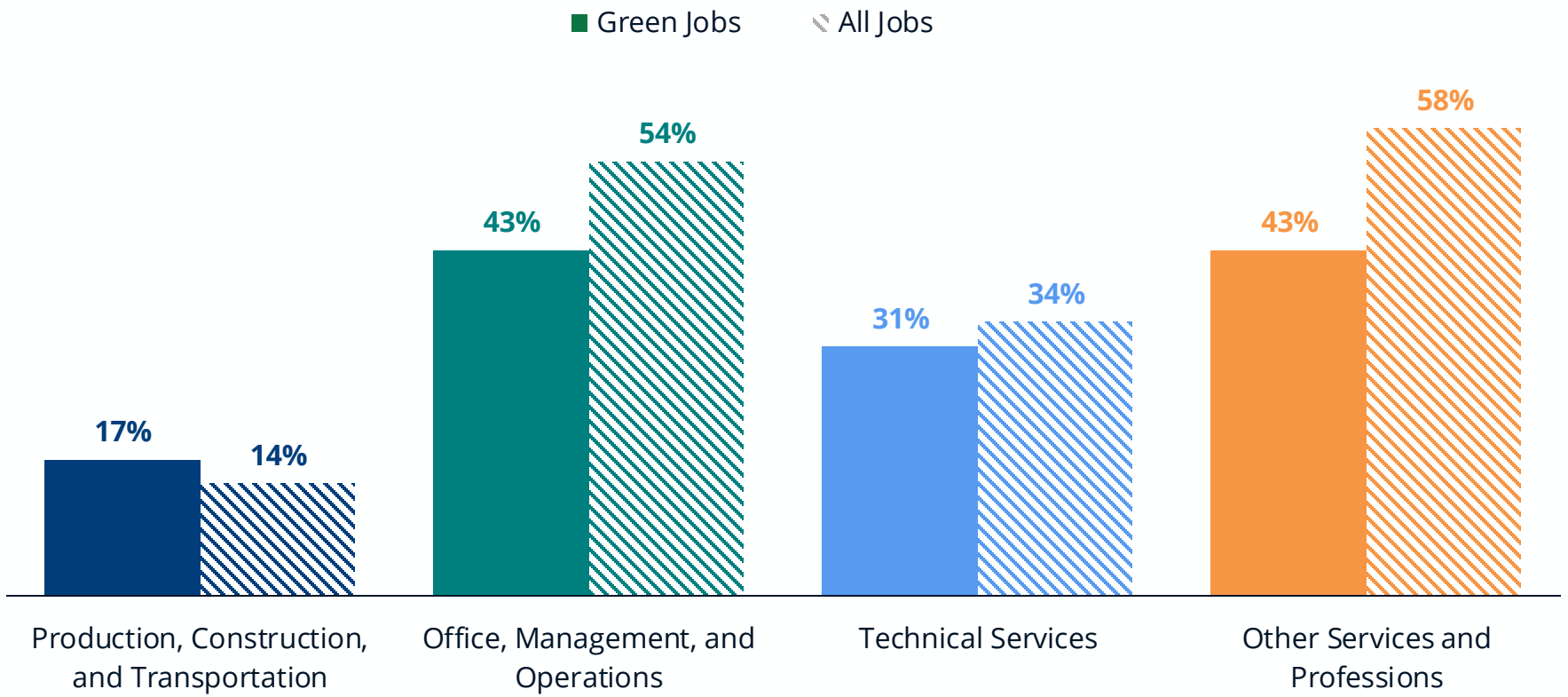


Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | GENDER

Female representation is slightly better in Production, Construction, Transportation occupations compared to the entire economy. Otherwise, all occupation groups have lower female representation than Richmond's overall economy.

Female Representation by Occupational Groups in Richmond (2021)

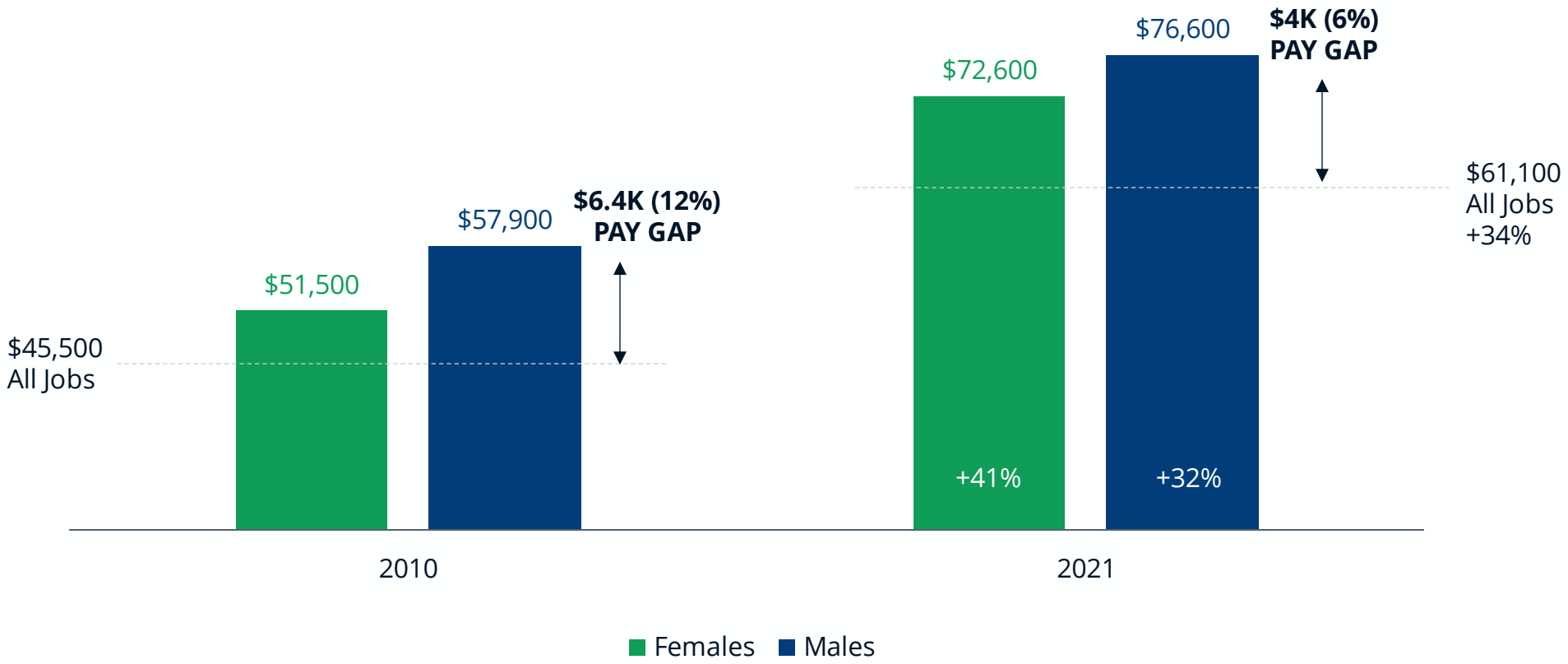


Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | GENDER

Over the last decade, the pay gap between male and female workers has decreased by about $2.4K. The average wage of women in Green Jobs are increasing at a faster rate compared to their male counterparts and the overall economy.

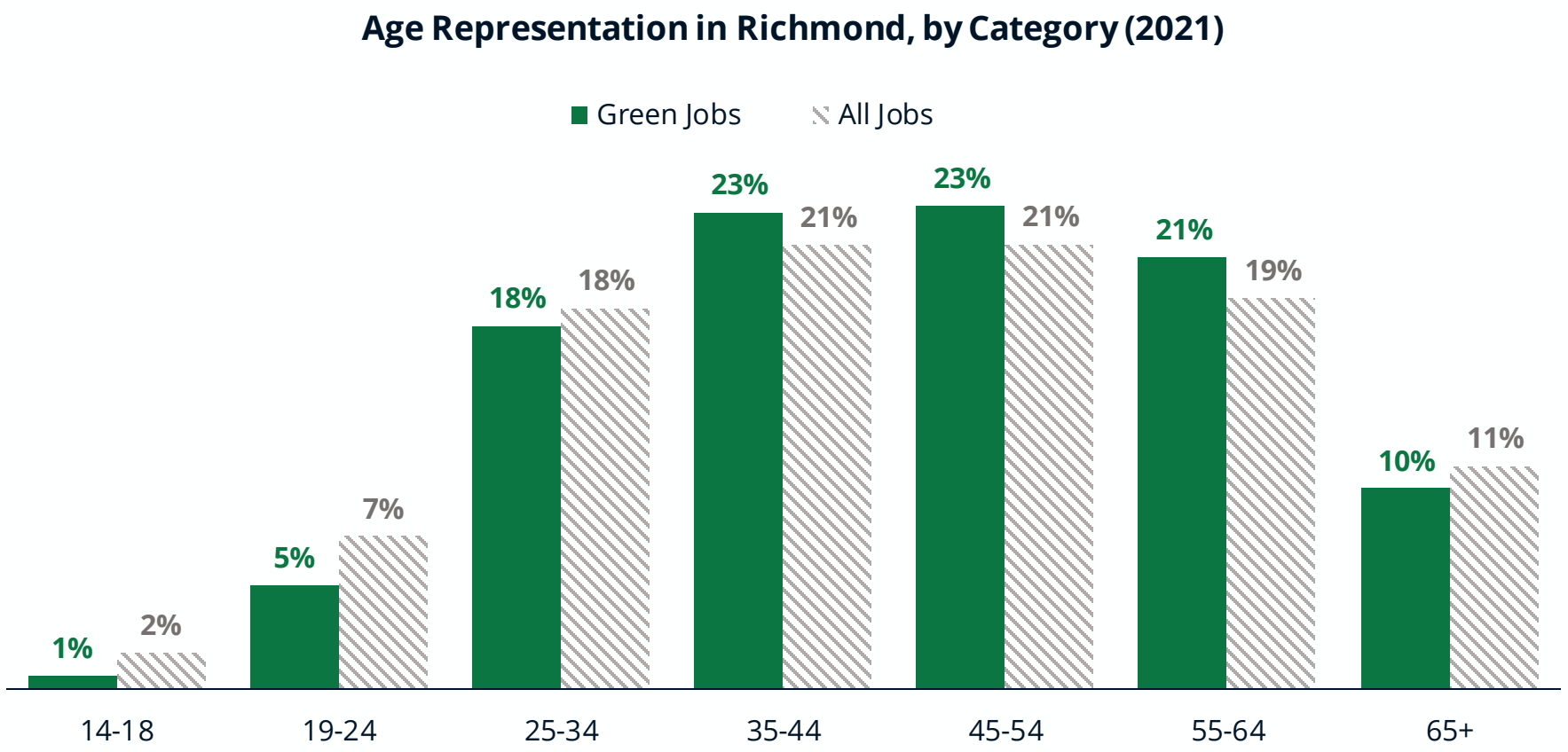
Green Jobs Average Annual Earnings by Gender in Richmond



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

GREEN JOB DEMOGRAPHICS | AGE

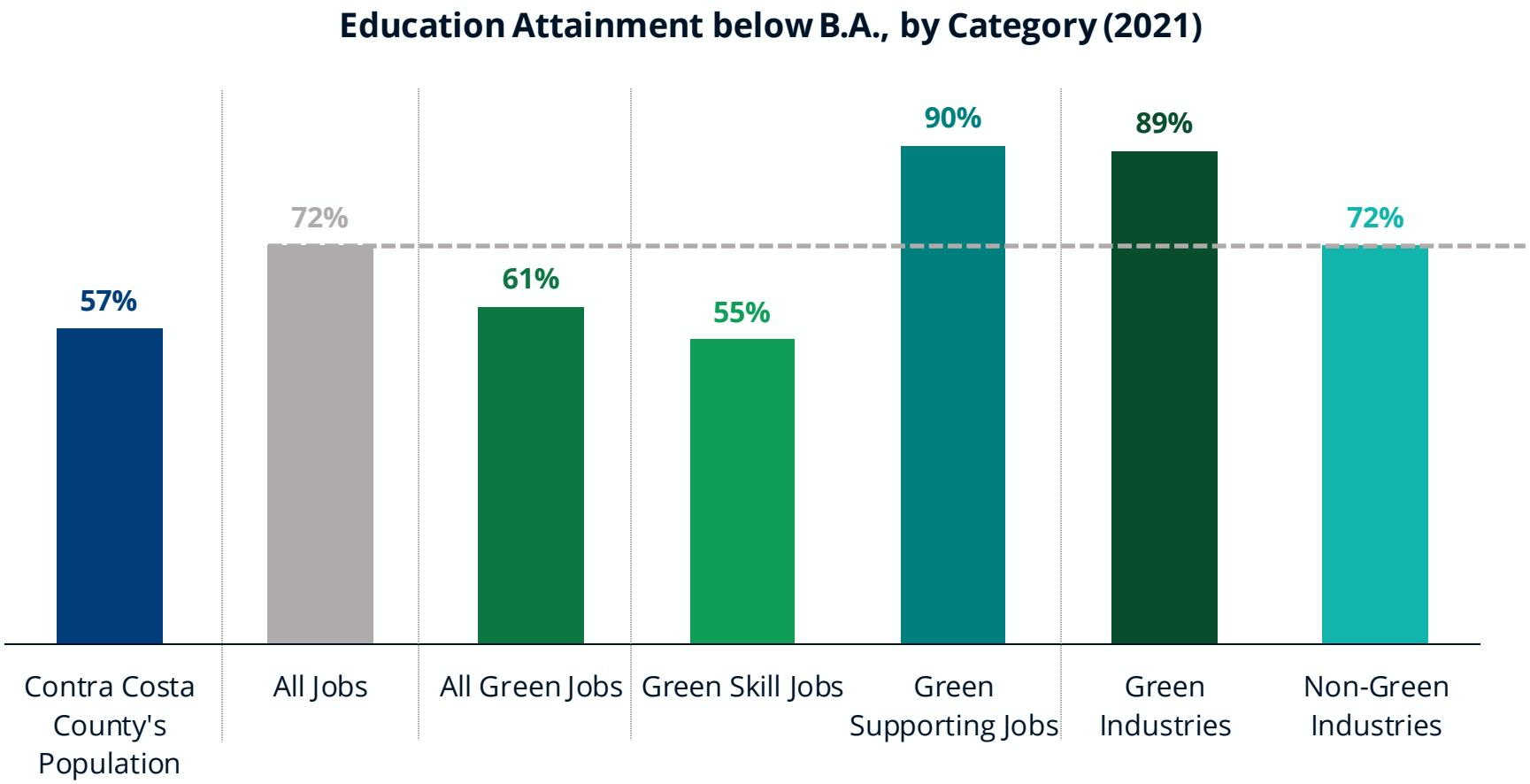
Workers in Green Jobs largely resemble the age distribution of all jobs in Richmond, with slightly more 35- to 64-year-olds in Green Jobs than total jobs.



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

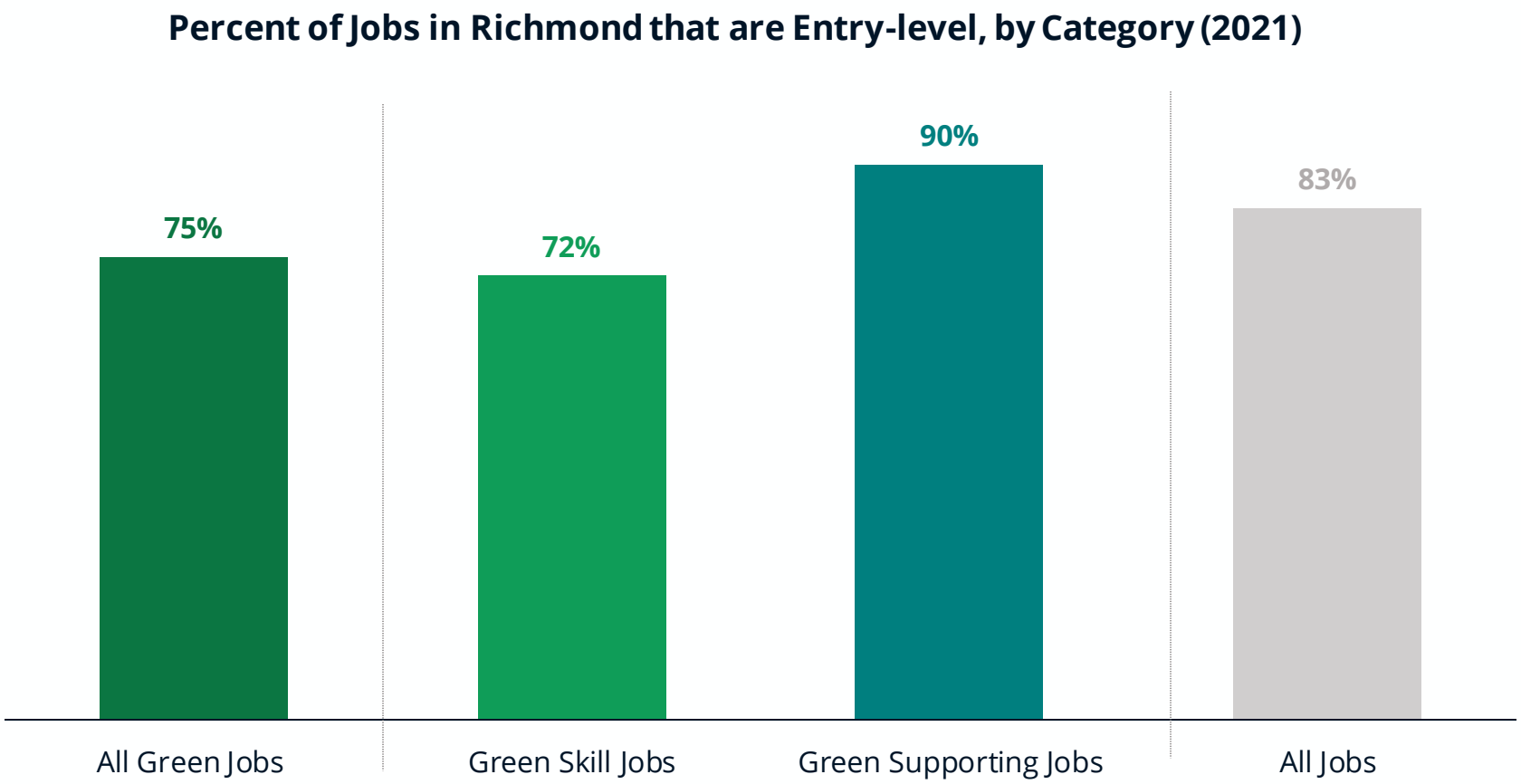
GREEN JOB DEMOGRAPHICS | EDUCATIONAL REQUIREMENT

On average, Green Jobs in Richmond require more education than other jobs.



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

Three-quarters of Green Jobs are entry-level positions, slightly fewer than the overall economy. 90% of Green Supporting Jobs do not require any previous work experience.



Source: HR&A's analysis of Lightcast data. Demographic data for jobs is not available for Richmond so all job demographics are based on Richmond job data and Contra Costa county demographic data.

Key Takeaways

1. The racial and ethnic breakdown of Green Jobs is similar to that of the overall worker population in Contra Costa County.

2. Green industries tend to be more diverse than non-green industries, with significantly higher representation of Black and Hispanic workers, though slightly lower Asian representation.

3. Although wages in Green Jobs rose faster for non-white workers from 2010 to 2021 than for white workers, Black and Hispanic workers still earn $14,100 less per year than white workers.

4. Half of Richmond's workforce is female, but less than one-third of its Green Jobs are women.

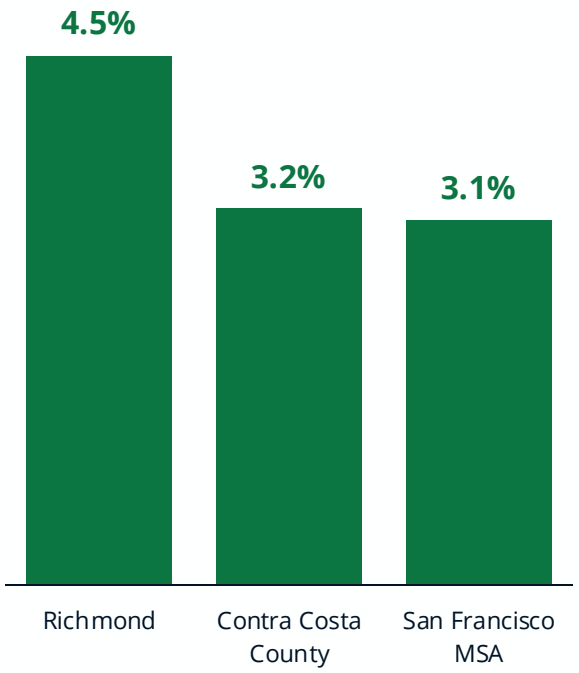
5. Among Green Jobs, there is a $4,000 pay gap between men and women, though it was almost 1.5 times as large in 2010.

RICHMOND'S GREEN JOB TRENDS

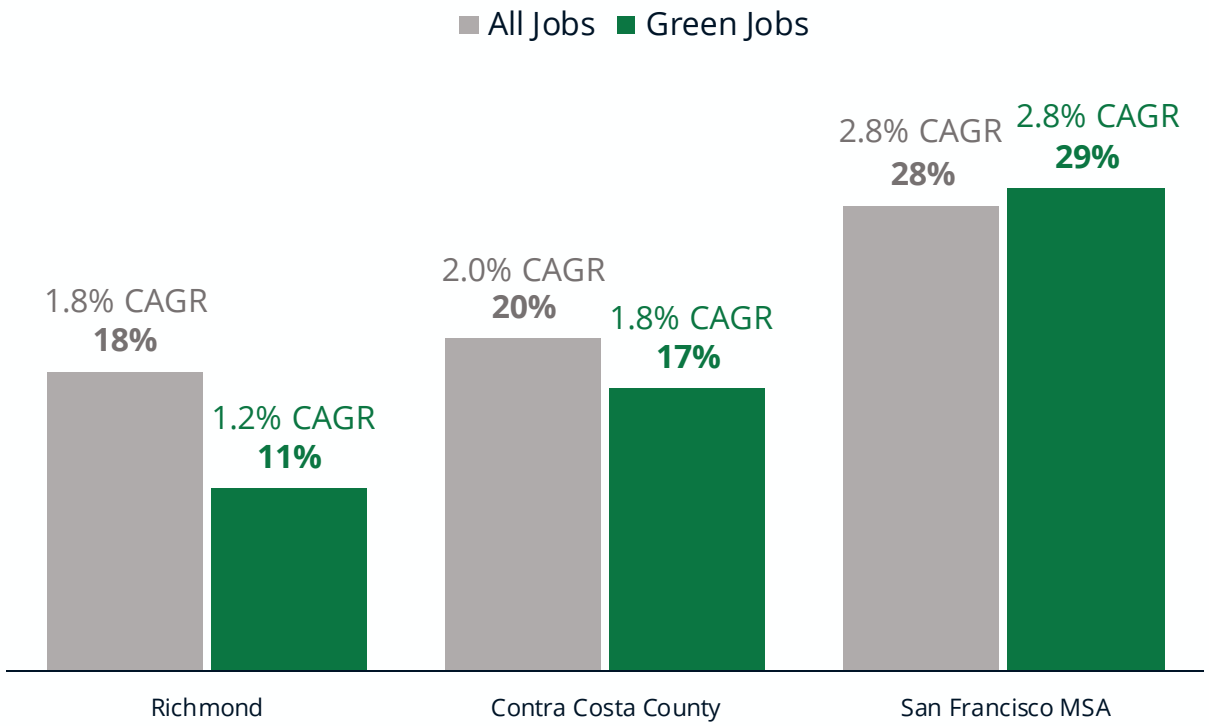
GREEN JOBS | COMPARATIVE GROWTH TRENDS

Green Jobs make up a greater share of jobs in Richmond than in the County and the MSA. However, between 2010-2019, Green Job growth in Richmond lagged the overall job growth, while in the County and the MSA, Green Jobs grew almost at par with overall jobs.

Share of Green Jobs in Entire Workforce, by Region (2021)



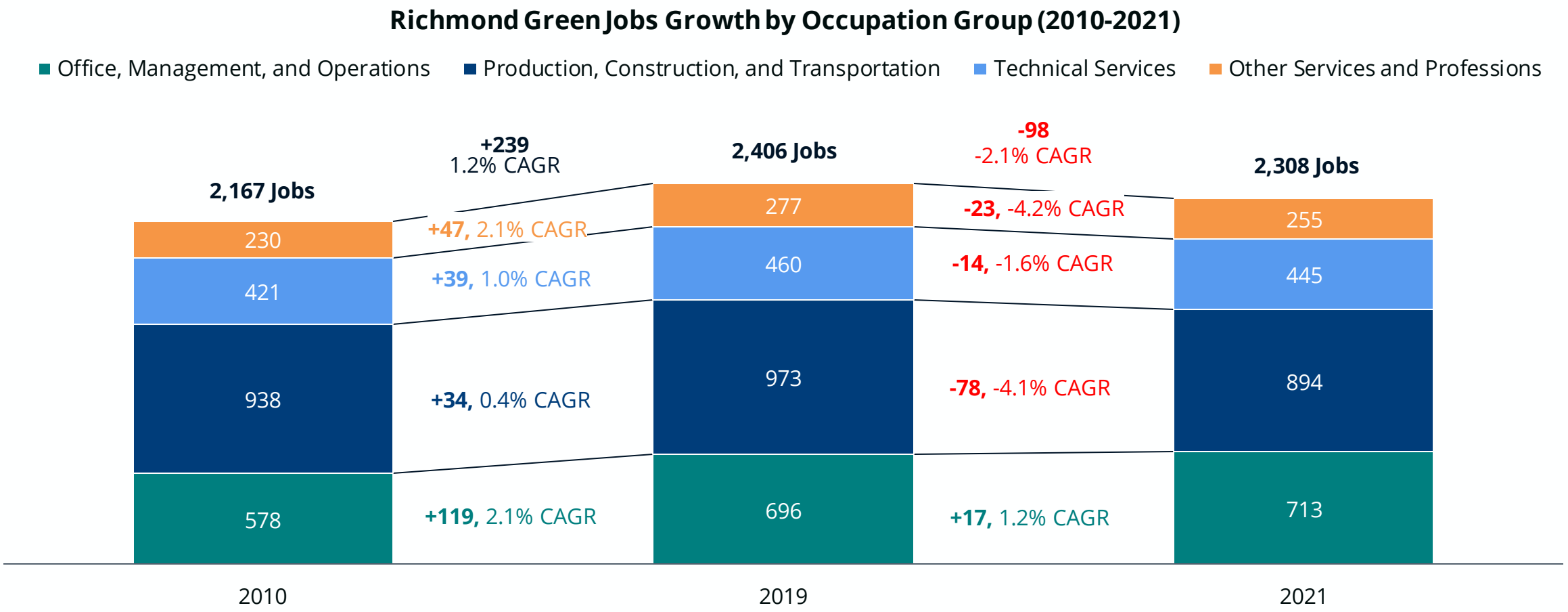
Jobs Growth, by Region (2010-2019)



Source: HR&A's analysis of Lightcast data.

GREEN JOB TRENDS

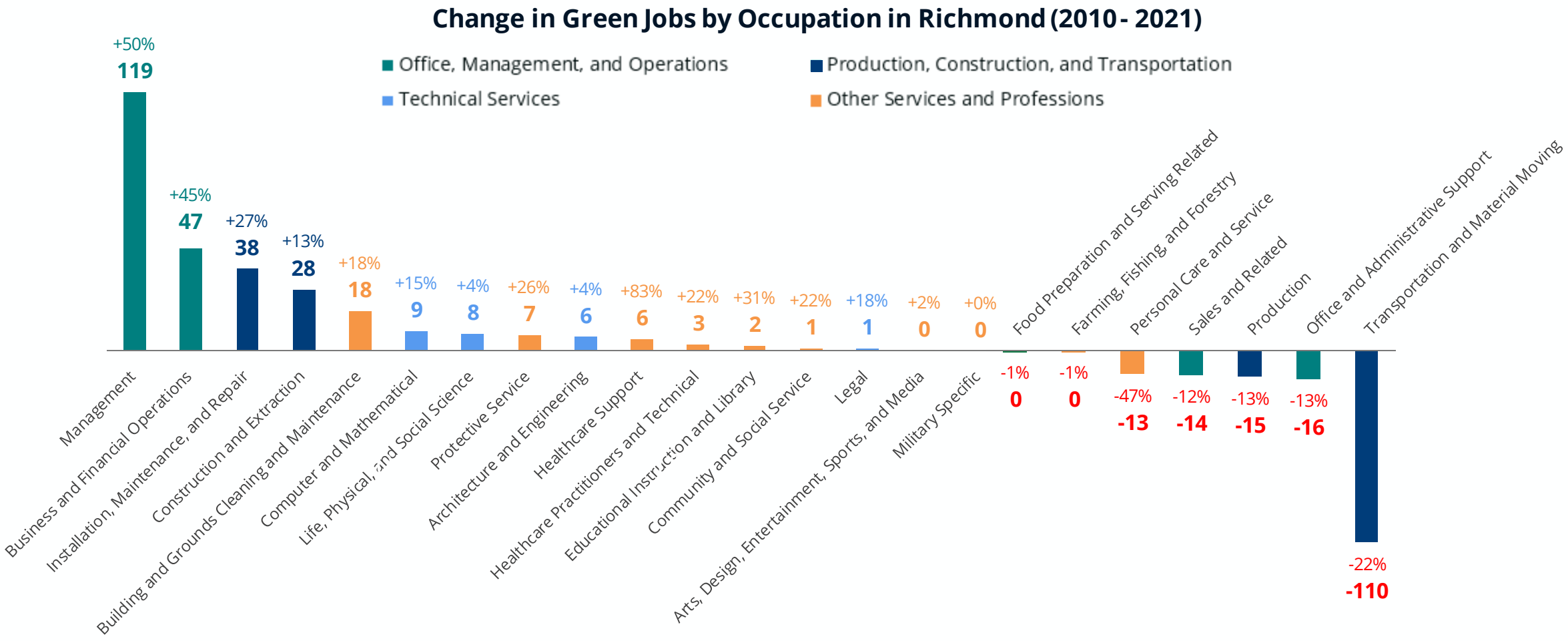
Green Jobs in Office, Management, and Operations have been the fastest growing, experiencing growth even during the COVID-19 pandemic. Production, Construction, and Transportation Green Jobs were most severely affected during the pandemic.



Source: HR&A's analysis of Lightcast data.

GREEN JOB TRENDS

Management occupations are the fastest growing in terms of Green Jobs, followed by Business occupations. At the same time, Green Jobs in Transportation and Material Moving have declined by the greatest number in the past decade.



Source: HR&A's analysis of Lightcast data.

Key Takeaways

1. In Richmond, Green Jobs grew at 1.2% per year from 2010 through 2019, a growth rate 50% *slower* than that of jobs overall.

2. In that period, green Office, Management, and Operations jobs grew faster than jobs in other occupations, comprising almost 50% of local Green Job growth.

3. Between 2019-2021, Green Jobs in Richmond showed less resilience compared to the County and the MSA. In Richmond, Green Jobs dipped by a sightly larger share compared to all jobs.

RICHMOND'S

GREEN JOB BUDGET ANALYSIS

MUNICIPAL BUDGET ANALYSIS | OPERATING BUDGET

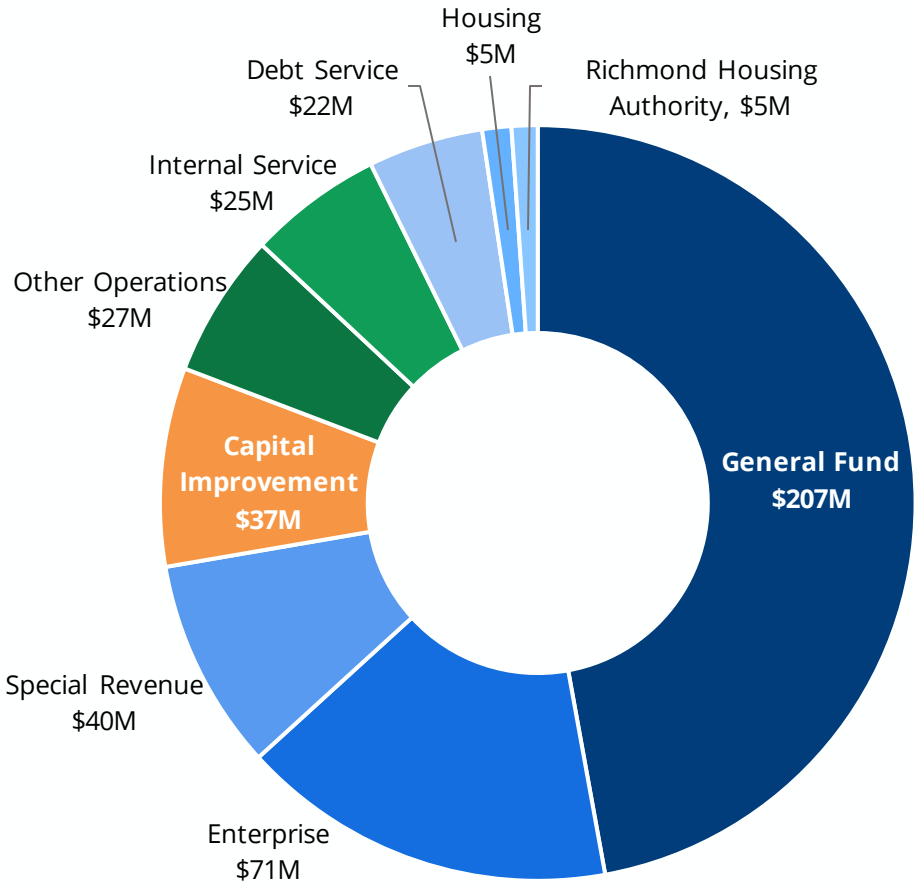
For FY22-23, Richmond's total operating budget is just over $438M. This analysis focuses on the General Fund, which makes up nearly half of the operating budget, as General Fund spending is relatively flexible compared to funds for specific uses.

Within city budgets, the General Fund is a key source of discretionary funding. With $207M total, the City staff and City Council can make requests for how the funds are allocated year over year.

For instance, in FY22-23, the City Council allocated over $1.5M in funds to the following programs: Housing First Framework ($425K), founding the Public Bank East Bay ($750K), Reparations, Equity, and Inclusion Implementation ($250K), a Literacy Fair ($5K), and Short-Term Emergency Housing Interventions ($100K).

Most other revenue sources are allocated more strictly. The total Non-General Fund budget totals nearly $232M and "includes funds dedicated to several programs and services that require tracking of expenditures in specific funds", for instance, debt service and enterprise funds.

City of Richmond Total Revenue by Fund (FY22-23)



Source: Richmond Adopted Annual Budget FY2022-23

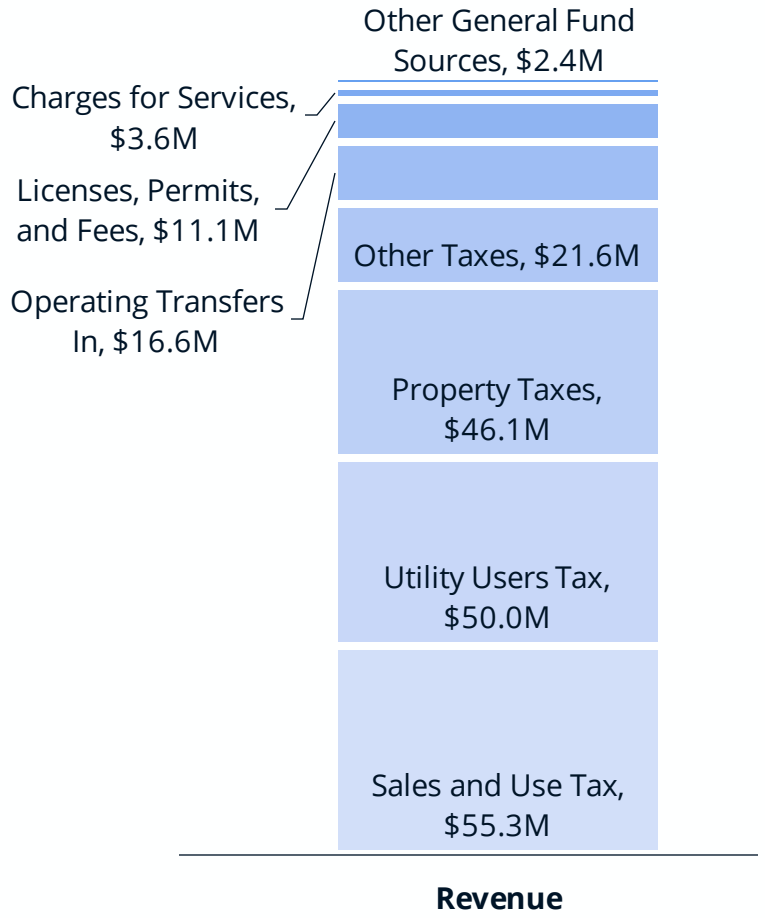
MUNICIPAL BUDGET ANALYSIS | OPERATING BUDGET

General fund revenues come from a mix of local taxes, with property, utility, and sales and use taxes each comprising about 25% of total revenue. The utility tax rate is high compared to peers', which could incentivize conservation but also burden lower-income taxpayers.

Within a balanced general fund budget, the City of Richmond's revenue sources are fairly typical of California cities, with the majority of revenue coming from Sales and Use Tax receipts and Property Tax receipts.

However, the City of Richmond's Utility Users Tax rate is much higher than other cities in California. The City of Richmond taxes at 10% on electricity and gas, 9% on telecommunications, and 9.5% on prepaid wireless (typically, utility user tax falls in the 4% to 6% range).

Revenue from utilities is a significant part of the City budget, showing a connection to Green Jobs in Richmond.



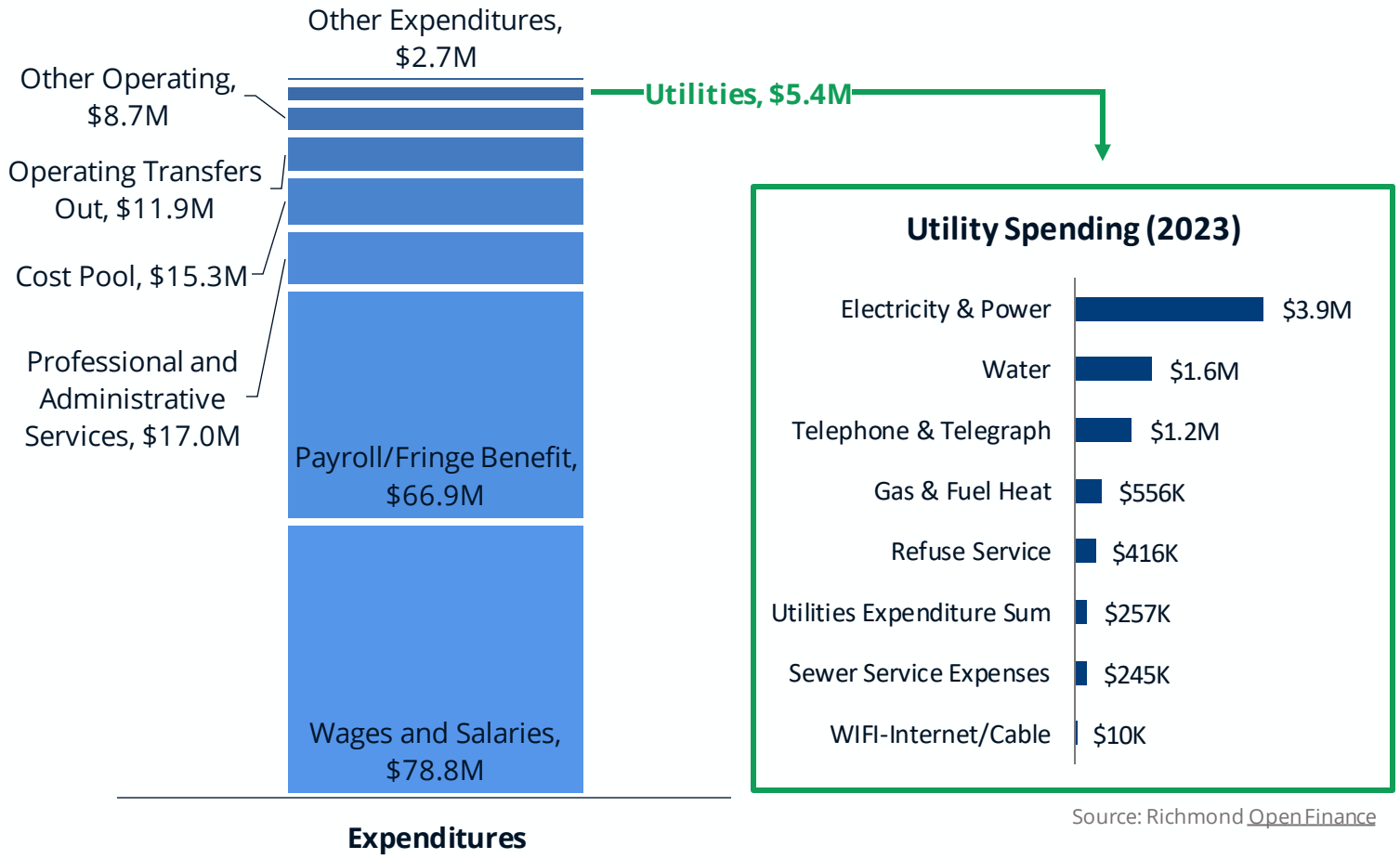
Source: Richmond Adopted Annual Budget FY2022-23

MUNICIPAL BUDGET ANALYSIS | OPERATING BUDGET

Over 70% of General Fund expenses go to staff wages, salaries, and benefits. Of interest to the Green-Blue New Deal, the City spends $5.4 million on utilities, most of which is for electricity.

City spending on utilities is primarily in green sectors like electricity and water, as opposed to non-renewable sources like gas and fuel. By increasing the electrification of City assets, it can continue to drive down spending on non-renewable energy. This may support Green Jobs in construction and retrofits, maintenance and upkeep, and even monitoring and administration.

Note: The utility spending budget at right totals $8.1M, as it includes non-general fund sources.



Source: Richmond Open Finance

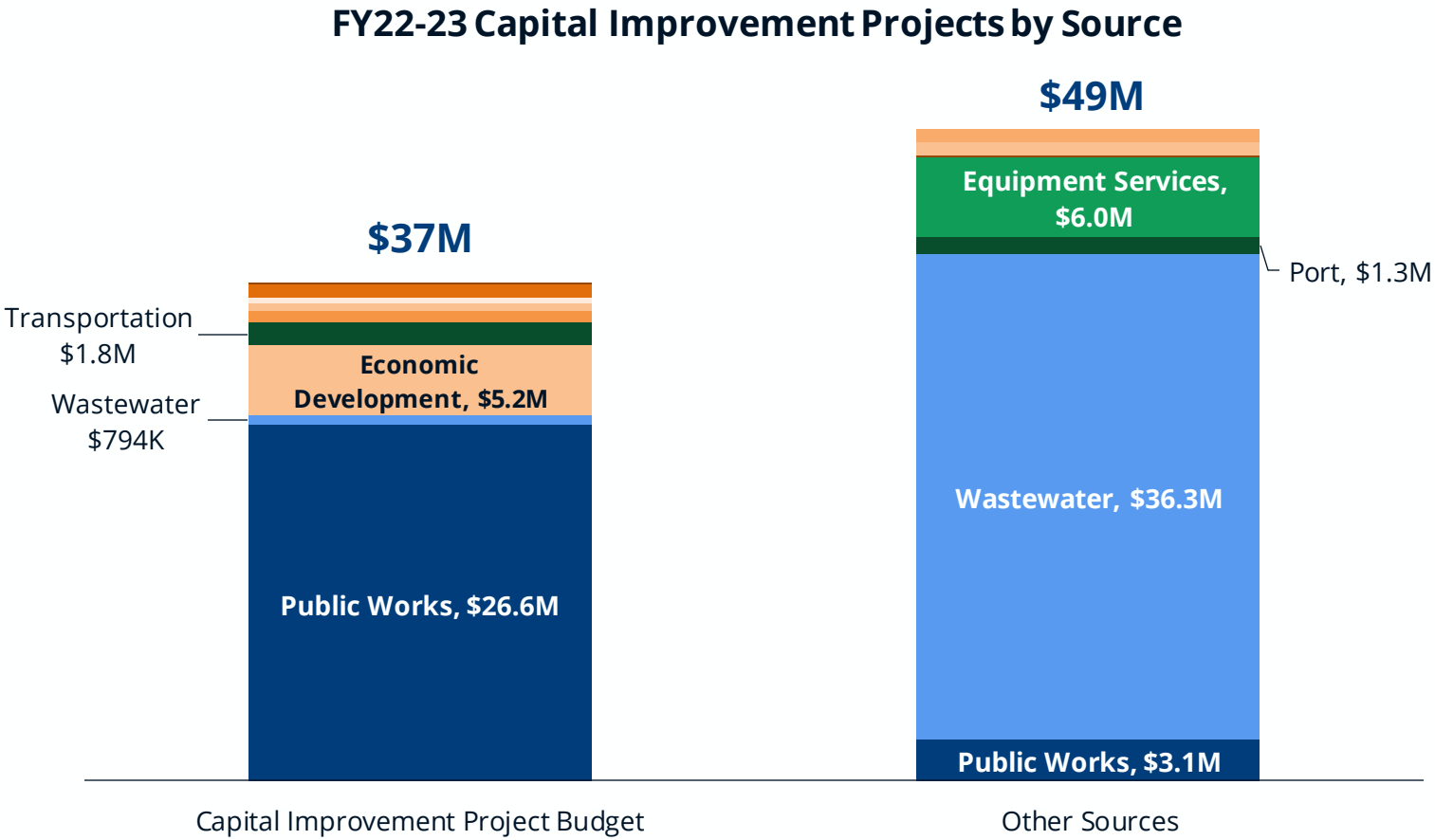
Source: Richmond Adopted Annual Budget FY2022-23

The FY22-23 operating budget includes $37 million in capital expenditures; beyond the operating budget, an additional $49M is allocated in capital improvements, bringing the total allocation to $85M.

This analysis additionally includes an overview of relevant Capital Improvement Projects (CIP), both for the current fiscal year (as shown at right) and in future projections. In departments or divisions related to Green Jobs, CIP investments show opportunities to support job growth in Richmond.

CIP funds come from a series of different revenue sources. Those included in the annual operating budget include Gas Tax, Measure J, Outside Grants, Impact Fees, and others. Additional funding, including revenue from the Enterprise Fund, Marina, Wastewater, ARPA, and other, are noted separately at right.

Departments with spending relevant to Green Jobs are highlighted in green and blue. As seen at right, the vast majority of the funds in the upcoming year will go towards various Public Works projects, described in further detail on the following pages. Green Jobs opportunities may also readily available in Transportation, the Port, and Economic Development.



Note: This excludes $7,315,055 for Port Operations, $23,212,632 for Wastewater Operations, $1,155,168 for KCRT operations, $9,486,735 for ECIA Operations, $123,842 for Urban Forestry, $950,000 for Other Operations, and $293,593 for Marina Operations. These are not capital line items, though they are included in the Capital Improvement Projects section within the CIP.

Source: Richmond Adopted CIP Budget FY2022-23

The Public Works Department maintains much of the City's infrastructure, including its roads and building, thus advancing the City's climate goals and supporting Green Job creation.

The Department of Public Works contains many Divisions responsible for various aspects of City assets: Abatement, Parks and Landscape Maintenance, Engineering and Capital Improvement Projects, and Fleet Maintenance.

Within the upcoming CIP, planned improvements to green infrastructure, including parks and trails, help support environmental resilience. Other traffic improvements, including the 13th Street Complete Street project, help create and improve walking and biking infrastructure.

Fiscal Year	2021-22 *Adopted*	2021-22 *Actual*	2022-23 *Adopted*	2023-24 *Proposed*	2024-25	2025-26	2026-27	Five Year Total
13th Street Complete Street	$1.4M	$0.1M	$0.8M	$3M				$3.8M
American Rescue Plan Act (ARPA) Improvements*	$2M	$0M	$1.8M					$0.9M
Street Paving	$5.3M	$2.4M	$4.9M	$4.8M	$4.9M	$4.9M	$5M	$24.5M
Traffic Safety Improvements	$11.9M	$4.8M	$4.2M	$260K	$260K	$260K	$260K	$5.3M
Greenway Improvements	$0.4M	$0.1M	$0.1M					$0.1M
Building Improvements	$1.1M	$0.1M	$1M					$1M
Park Improvements	$11.7M	$0.8M	$9.9M					$9.9M
SF Bay Trail Improvements	$1.1M	$10K	$1M					$1M
Other	$11M	$1.9M	$5.9M	$1M	$1M	$1M	$1M	$11M
Total	**$46M**	**$10.2M**	**$29.7M***	**$9M**	**$6.2M**	**$6.2M**	**$6.3M**	**$57.5M**

Note: Rows above are summed categorizations of similar project types.
* ARPA-funded projects are included in "Other Sources" in prior slide.

Source: Richmond Adopted CIP Budget FY2022-23

The Water Resources Recovery Division is planning nearly $48.1M in public improvement projects, which can support Green Jobs in environmental compliance and water safety.

The Water Resource Recovery Division, within the Public Works Department, is responsible for the city's sewer collection system and wastewater treatment. The Division is a heavily resourced division due to the need for frequent upkeep and replacement of assets like sewers and sanitation. Most projects in the Division are compulsory and help the City avoid sanitary sewer overflows.

Green Jobs can both help keep water systems safe and improve the efficiency of operations. For instance, one improvement at the Wastewater Treatment Plant (WWTP) is the installation of a unit to reuse the digester gas and provide power for the Wastewater Treatment Plant, thus reducing energy consumption.

Water Resource Recovery can increasingly use "green infrastructure" or more ecologically conscious techniques as well. At Rheem Creek Watershed, the Flood Risk Reduction project is designed to use environmental restoration to stabilize the channel and improve creek habitat.

Fiscal Year	2021-22 *Adopted*	2021-22 *Actual*	2022-23 *Adopted*	2023-24 *Proposed*	2024-25	2025-26	2026-27	Five Year Total
Wastewater Treatment Plant (WWTP) Upgrades	$43.2M	$12.9M	$25.7M					$25.7M
Routine Sewer Maintenance	$6.2M	$2.1M	$4.1M	$2.8M	$2.8M	$2.8M	$2.8M	$15.1M
Sewer Capacity Improvements	$14.6M	$3.9M	$5.2M					$5.2M
Flood Risk Reduction Rheem Creek Watershed			$1.6M					$1.6M
Other	$1.6M		$515K					$515K
Total	**$65.7M**	**$18.81M**	**$37.1M**	**$2.75M**	**$2.75M**	**$2.75M**	**$2.75M**	**$48.1M**

Note: Rows above are summed categorizations of similar project types.

Source: Richmond Adopted CIP Budget FY2022-23

Planned improvements at the Port, including berth electrification, show areas for Green Jobs in both installation and maintenance of electrification infrastructure.

At the Port, major improvements are planned for the Point Potrero Marine Terminal (PPMT) in order to meet updated state requirements.

Over the upcoming fiscal year, $1.2M will be spent on upgrades and improvements. Most significantly, $750K will be used to "install shore power system consistent with the requirements of the California Air Resources Board. This project will install electrical substation, conduits, conductors, and plug-in equipment at the PPMT berth."

However, no planned investments in electrification maintenance are noted for upcoming fiscal years. Green Jobs will likely be needed for operation and maintenance of these electrical systems, including monitoring and updating the equipment.

Fiscal Year	2021-22 *Adopted*	2021-22 *Actual*	2022-23 *Adopted*	2023-24 *Proposed*	2024-25	2025-26	2026-27	Five Year Total
PPMT Berth Electrification			$750K					$750K
PPMT Repairs and General Upgrades	$151K	$44K	$400K					$400K
PPMT Environmental Compliance			$100K					$100K
PPMT Electrical Upgrades	$50K	$35K						
Terminal 2 Improvements	$504K	$4K						
Other	$139K							
Total	**$844K**	**$82K**	**$1.25M**					**$1.25M**

Note: Rows above are summed categorizations of similar project types.

Source: Richmond Adopted CIP Budget FY2022-23

Outside grants given to the Transportation Department advance Green Jobs through programs in shared mobility and citywide electric vehicle readiness.

All CIP funding for the Transportation Department fall under FY22-23 and were provided by outside grants. For instance, the California Energy Commission's (CEC's) Clean Transportation Program released funds for "projects developed and identified in Phase I, Blueprint Development, of the Electric Vehicle (EV) Ready Communities Challenge."

Outside funds can continue to supplement Green Jobs, particularly in sectors that are aligned with state and federal priorities like transportation electrification. Many grant funds require some match of local funding; as additional projects seek grant funding, the City should consider holding or proposing funds for matching grants.

	FY2022-23 Adopted
Bike Share Program (Staff Time)	$52,000
CEC Phase II EV Ready Communities Phase 2	$554,949
MTC Nystrom Village Hub	$261,646
On Demand Shuttle	$900,000
Total	**$1,768,595**

Source: Richmond Adopted CIP Budget FY2022-23

In addition to the budgeted projects in the five-year CIP, there are $242M in unfunded CIP requests. $193M are proposed to be allocated in the next five years; the remaining $48M do not yet have a fiscal years assigned and are primarily in the Public Works Department.

Over the next five years, additional projects with opportunities to invest in Green Jobs may come from capital projects that are currently unfunded but with proposed allocation dates.

In the Public Works Department, unfunded requests include upgrades to HVAC, lighting systems, roofs and repairs, and other facility improvements that can help make Richmond's buildings more environmentally sustainable.

Funds requested in the Library Department and Community Services Department represent similar opportunities – by improving the energy efficiency of Richmond's assets, the City can create Green Jobs in heating and cooling system repairs while also improving its internal carbon efficiency.

Capital Unfunded Request FY2022/23 to FY2026/27

	Adopted FY2022-23	Proposed FY2023-24	Proposed FY2024-25	Proposed FY2025-26	Proposed FY202627	Fiscal Year Not Yet Assigned	Total
Police Department		$2M	$78M				**$80M**
Public Works Department		$4M	$13M	$15M	$1M	$43M	**$75M**
Library Department		$1M	$3M	$24M	$24M	$1M	**$52M**
Fire Department		$1M	$16M	$1M			**$17M**
Information Technology Department		$3M	$2M	$2M	$1M		**$8M**
Community Services Department							
City Attorney Department		$1M	$1M	$0M	$1M		**$3M**
Employment & Training Department		$0M					**$300K**
Total		**$14M**	**$113M**	**$41M**	**$26M**	**$48M**	**$242M**

Note: Rows above are summed categorizations of similar project types.

Source: Richmond Adopted CIP Budget FY2022-23

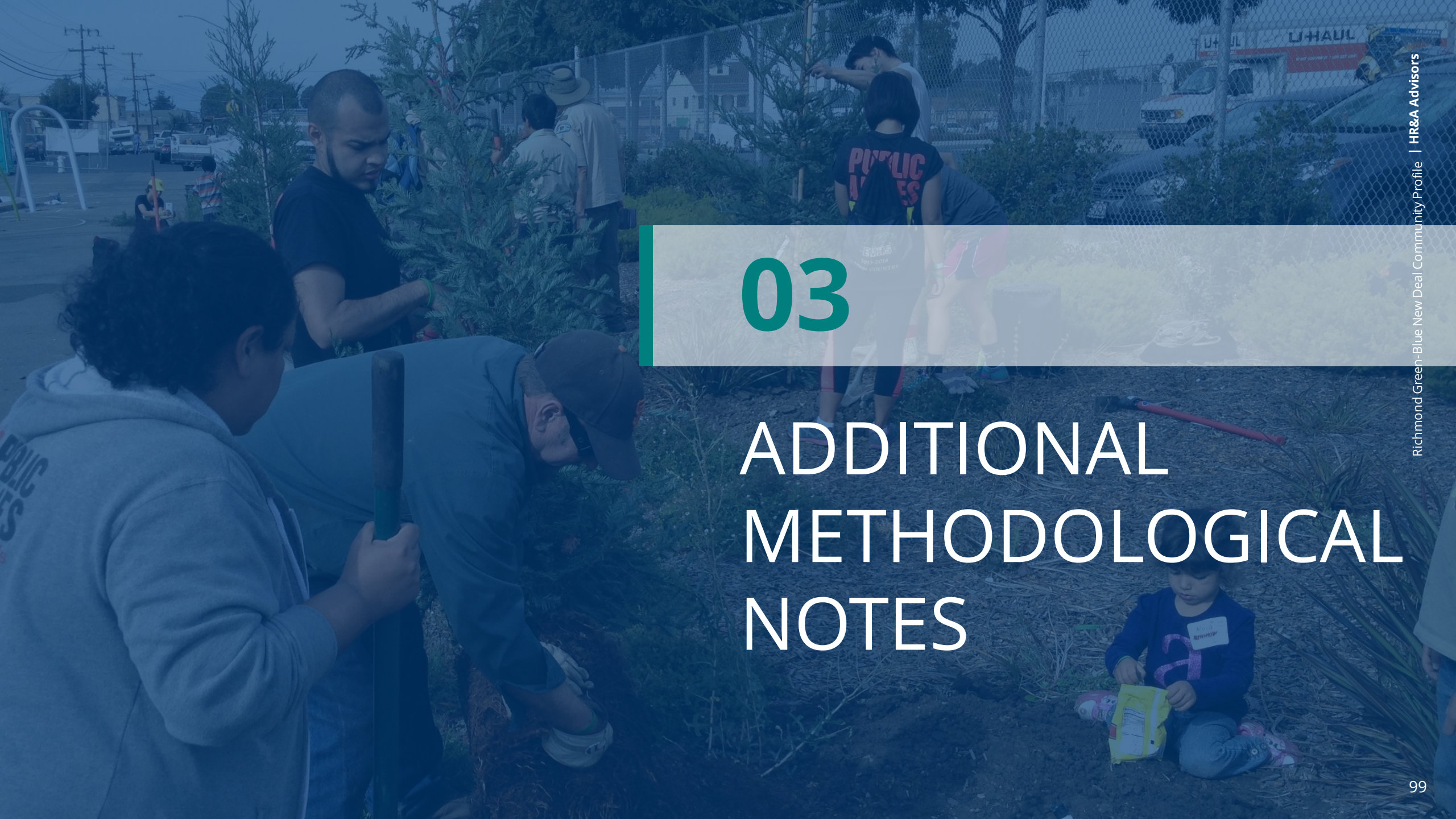
Key Takeaways

1. The City Council has flexibility to set spending priorities within the $207M General Fund and could set aside some funds to support Green Job development in Richmond.

2. Richmond has planned significant infrastructure investments for the next five years, many of which support environmental resilience and create Green Jobs in both construction and operation of those projects. For example:
    - Improving efficiency of city-owned buildings
    - Maintaining clean water infrastructure
    - Expanding ecological restoration and “green infrastructure” projects like parks and trails
    - Electrifying the Port
    - Installing necessary equipment for electric vehicles

3. Many other capital improvement projects remain unfunded, including park and open space restorations, updating the heating and cooling system at libraries, adding lighting to the auditorium stage, and other facility improvements that could achieve environmental benefits.

4. City Departments could place greater emphasis on encouraging capital improvement project leaders to seek and secure funds for green projects.



03

ADDITIONAL METHODOLOGICAL NOTES

GREEN ECONOMY

Definitions of the green economy and Green Jobs vary across institutions, but all share a focus on environmental sustainability.

Example Green Economy Definitions

State of California EDD: California's Green Economy

Generating and storing renewable energy; recycling existing materials; energy efficient product manufacturing; education, compliance, and awareness; natural and sustainable product manufacturing.

United Nations

A green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services.

Example Green Job Definition

Bureau of Labor Statistics

Green Jobs are jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources.

Or

Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources

BLUE ECONOMY

Blue economy definitions refer to any economic activities that are water/ocean-dependent or to a subset of those activities that are environmentally sustainable or restorative.

Broad Definitions

European Commission

All economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors. United Nations.

The Center for the Blue Economy

It is now a widely used term around the world with three related but distinct meanings—the overall contribution of the oceans to economies, the need to address the environmental and ecological sustainability of the oceans, and the ocean economy as a growth opportunity for both developed and developing countries.

Sustainability-related Definitions

World Bank

The Blue Economy is the economy that depends on the use of oceans and other water resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems.

City of Richmond Resolution 88-21

Blue Economy is not synonymous with all economic activity that occurs on coastlines and shorelines or any use of water resources, nor simply technological innovation involving water-based industries. The Blue Economy represents a narrower band of economic activity that is restorative to ocean and shoreline ecosystems and promotes broad-based economic opportunity including “blue jobs”

GREEN-BLUE ECONOMY

For this Green-Blue New Deal study, the green-blue economy includes the entire green economy, with a special focus on the subset that is water-dependent or "green-blue".

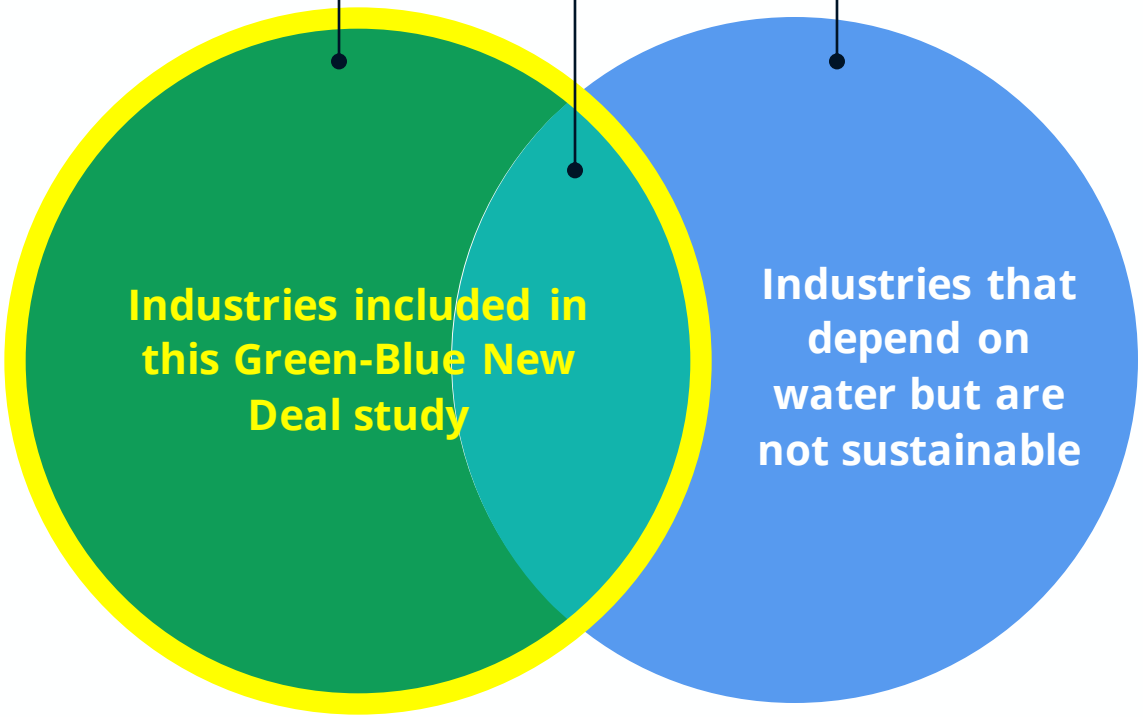
Green Economy

Activities that **contribute to preserving or enhancing the natural environment for current and future generations**

Water-dependent activities that also preserve or enhance the natural environment

Blue Economy

Any activity that **depends on water** (e.g., fisheries, goods shipping, offshore drilling).



CATEGORIZATION

Green jobs are both jobs at green businesses and sustainability-focused jobs in non-green industries.

	GROUPINGS	EXAMPLES	CLASSIFICATION SYSTEM
Businesses Classified by **Industry**	Business establishments are grouped into industries based on the goods and services they produce and the methods used to produce them.		North American Industry Classification System (NAICS)
Workers Classified by **Occupation**	Workers are grouped into occupations based on job duties and skills.		Standard Occupational Classification (SOC) System

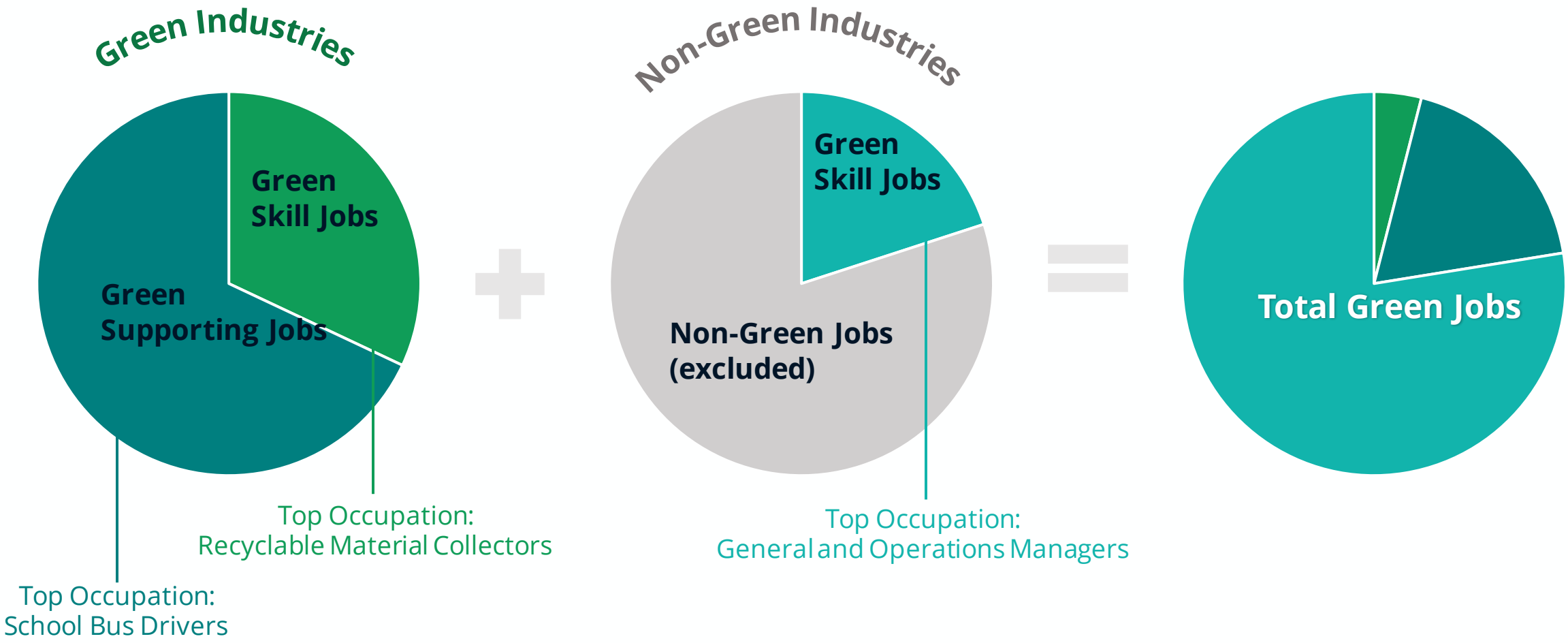
PRECEDENTS & DATASETS

HR&A reviewed top precedents and data sources related to the quantification of Green Jobs.

	Study				Dataset	
	Green Goods and Services (GGS)	**U.S. Energy & Employment Jobs Report (USEER)**	**Green and Growing: New York's Sustainable Economy**	**Green Jobs Now**	**Quarterly Census of Employment and Wages (QCEW)**	**Jobs Postings**
Publisher	Bureau of Labor Statistics (BLS)	U.S. Department of Energy	New York State Comptroller	Working Nation (ongoing)	Bureau of Labor Statistics (BLS), compiled by Lightcast	Lightcast, by scraping 45,000 websites worldwide
Focus	Revenue and employment driven by green goods and services	Energy sector jobs	Green jobs in New York state	Creating a holistic Green Jobs definition	Employment numbers and trends	Job postings mentioning particular skills
Strength	Most comprehensive survey to date on green economy	Comprehensive energy sector accounting on industry level	Specificity in Green Occupations by using O*NET SOC	Exhaustive comparison of different studies and their estimates	Most comprehensive employment data with ZIP level granularity	Machine learning based categorization of Green Skills
Limitation	Discontinued after 2011	Limited to energy sector	Makes problematic assumptions about distribution of sub-occupations	Ongoing effort; industries and occupations lack granularity	No specific categorization for Green Jobs	Limited insight on current jobs; proprietary data and skill coding methodology

METHODOLOGY OVERVIEW

Drawing on available datasets, we developed a methodology to deliver actionable results for the Richmond's workforce development plan, with a focus on Green Skills.



METHODOLOGY OVERVIEW

Lightcast (formerly EMSI) identifies over 30,000 skills sought by employers, of which over 100 are considered "green."

Lightcast Green Skill Category	Example Green Skills
Conservation	Marine Conservation, Conservation Biology, Wildlife Conservation
Education	Ecology, Environmental Education, Sustainable Development
Energy Efficiency	Certified Energy Manager, Corporate Sustainability, Green Building
Environment Health And Safety	Air Quality, ISO 1400 Series, Environmental Tests,
Regulatory	Environmental Laws, Environmental Impact Assessments
Renewable Energy	NABCEP Certified Energy Practitioner, Solar Energy, Wind Farming
Science	Climate Variability And Change, Environmental Chemistry
Technical	Environment Management, Geotechnical Engineering
Waste	Recycling, Waste Management, Materials Recovery

METHODOLOGY OVERVIEW

This study uses the best available data on jobs and job postings in Richmond to estimate the number of Green Jobs and characterize worker demographics.

GREEN SKILL JOBS

1. Using historic job postings on Lightcast[1], first determine the percentage of jobs in each occupation that require Green Skills.
2. Pro-rate each occupation's share of Green Skill Jobs by applying the green skill requirement percentage to the total number of jobs in that occupation.

Total Jobs in Richmond, by Occupation (Lightcast Estimate) × (Job Postings with Green Skills in Richmond ÷ Total Job Postings in Richmond) = Total Estimated **Green Skill Jobs** in Richmond

Green Skill Requirement Percentage, by Occupation

GREEN SUPPORTING JOBS

1. Using Lightcast[1], calculate total jobs in green industries, based on a national Bureau of Labor Statistics (BLS) survey on the percent of each industry's revenue derived from green activities.
2. Subtract the Green Skill Jobs in green industries previously calculated to estimate the number of jobs that are in green industries but do not require Green Skills.

Total Jobs in Green Industries in Richmond (Lightcast Estimate) − Total Green Skill Jobs in Green Industries in Richmond = Total **Green Supporting Jobs** in Richmond

3. Categorize Green Skill Jobs and Green Supporting Jobs to enable more nuanced analysis along dimensions including skills, occupation groups, major companies, and demographics.

Green Skills and Occupational Groups

Major Companies

Occupations and Worker Demographics

*HR&A is relying on Lightcast (formerly EMSI), a third-party labor data aggregation firm, to gather the share of job postings in various industries with green skills as a share of total jobs postings over the last 3-5 years. Lightcast has a Green Skills category established through benchmarking popular studies on green jobs, which can be modified if needed to suit our definitions.