

# GREEN JOBS

IN LOS ANGELES

**OPPORTUNITIES FOR ECONOMIC  
RECOVERY THROUGH EQUITABLE  
WORKFORCE TRAINING**



**HR&A**  
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This report was commissioned by the Los Angeles Cleantech Incubator (LACI), researched by HR&A Advisors, and funded through the California Workforce Development Board (CWDB) and City of Los Angeles Workforce Development Board.

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**Advisory Group Members**

Throughout the study, an Advisory Group convened on three separate occasions to offer guidance and feedback, and provide experience-driven insight. The Advisory Group represented the diverse stakeholders involved in the green economy, including academia, advocacy organizations, public sector and government representatives, industry and businesses leaders, labor and union organizations, and workforce development administrators.

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# EXECUTIVE SUMMARY

This report, commissioned by the Los Angeles Cleantech Incubator (LACI), researched by HR&A Advisors, and funded by the California Workforce Development Board (CWDB), and the City of Los Angeles Workforce Development Board, offers an in-depth analysis of Green Jobs<sup>1</sup> in Los Angeles County and lays forth a course of action to grow an economy in Los Angeles that is greener, stronger, and more inclusive. Through data analysis and a series of interviews, this study's findings demonstrate the current impact and future promise of Green Jobs:

- **The past decade has been marked by unprecedented growth in Green Jobs, which comprise an often underestimated cross section of Southern California jobs.** Most people can intuitively identify green workers in occupations such as solar photovoltaic installers and recyclable material collectors. However, these jobs are the tip of the iceberg: they represent less than half of the 338,000 Green Jobs and green-related jobs that make up the Los Angeles County green economy today. Underrecognized, Green Jobs include a broader spectrum of jobs in industries that may not be traditionally thought of as green but are critical to supporting sustainability, ranging from electricians and contractors to engineers and software developers.

- **As all industries become more sustainable, Green Jobs are expected to make up a larger and larger share of total employment.** This report finds that Los Angeles County's green economy could grow from 338,000 to 600,000 green jobs by 2050. This growth is expected to outpace overall County job growth, increasing by nearly 80 percent from 2020 compared to growth of just 40 percent for all jobs countywide.
- **Spending on green investments and sustainable infrastructure creates more jobs per dollar than other infrastructure investments and these jobs are accessible and well-paying.** Every \$1.0 million in spending on renewable energy creates 7.5 full-time jobs, compared to only 2.7 jobs for investments in fossil fuels.<sup>2</sup> Every \$1.0 million invested in transportation electrification could create up to 15 jobs. The vast majority of Green Jobs are available to workers without a college degree and, on average, pay \$3 more per hour than jobs in traditional industries.
- **As Los Angeles, California, and the nation rebuilds from the COVID-19 pandemic and ensuing economic recession, Green Jobs can drive an equitable economic recovery with strategic investments in workforce training.** Green Jobs represent a significant opportunity for Los Angeles job expansion. However, workers need a range of skills and technical knowledge to better support jobs in green industries and strategic investments in workforce training are required to strengthen and grow the workforce pipeline. Further, to ensure an equitable workforce, programs should target women and people of color, who are currently underrepresented among green industries.



1. Green Jobs as defined as jobs in businesses that directly produce green goods or services or jobs in other types of businesses that are directly responsible for making their establishments more environmentally friendly.

2. Hepburn, Cameron et al. "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?". Smith School Working Paper 20-02. May 4, 2020.

# OUR RECOMMENDATIONS

LACI commits to working with regional stakeholders and other partners to achieve our goal of creating 600,000 green jobs countywide by 2050—an ambitious yet achievable goal—by working together to implement the following recommendations:

## 1 | Accelerate Economic Recovery

Drive green job creation through continued local public investment (e.g., Measures M, R, and W) as well as infrastructure stimulus at the federal and state levels, including:

- Supporting President Biden’s proposed \$2 trillion infrastructure stimulus package and ensuring LACI’s Transportation Electrification Partnership’s (TEP) \$150 billion stimulus proposal is included by urging Congress to make unprecedented investments in the nation’s transportation infrastructure, including targeted workforce investments.
- Supporting the Governor’s proposed economic recovery package, in particular, the \$1.5 billion proposed for infrastructure and incentives to implement the state’s bold zero emission vehicle goals to create jobs, advance equity, and electrify goods movement.
- Creating the California Electric Vehicle Authority (CEVA) to accelerate transportation electrification through enhancing coordination, financing, and related workforce and economic development.
- Using the power of the public purse at the local, state, and federal level to use purchasing to bolster economic growth and green job creation (e.g., President Biden’s historic executive orders on January 27 to require every level of federal government to advance climate action and environmental justice, purchase EVs and zero-carbon electricity, accelerate clean energy projects, etc.), through EV procurement, charging infrastructure, building electrification, modernization of the electric grid, water and recycling infrastructure, and zero emissions public and active transit.



## 2 | Bolster the Workforce Pipeline

Build capacity to create more responsive and nimble workforce training for future segments of the green economy through:

- Convening a regional consortium to mobilize key stakeholders to work together to achieve the 2050 goal of creating 600,000 green jobs county-wide by setting and pursuing the milestones, targets, and actions needed for success.
- Ensuring local, state, and federal funding criteria reinforce and support workforce training programs to be updated to better prepare individuals with green jobs knowledge and resources for growing sectors.
- Creating a Green Jobs online portal to provide information on green career ladders, workforce development programs, and job postings across the County.
- Advocating for recovery funds to be directed towards workforce development program administrators to appropriately outfit their facilities to support green job training.
- Enhancing and increasing funding for programs designed to recruit and support populations who face additional barriers by providing more soft skill and professional development training than traditional career technical education courses currently do.
- Developing industry-led technical support to create more responsive training aligned with future segments of the green economy (e.g., emerging EV charging sector).
- Investing in shared workforce training facilities, or collaborations with lab space and business incubators.



### 3 | Advance Equity and Inclusion

Increase underrepresented populations in green industries through training for high-road employment opportunities through recommendations to the state and regional workforce investment boards, and other related organizations, including:

- Creating grants and seed funding for minority and women-owned startups and small businesses, as they are least likely to receive traditional venture capital funding.
- Promoting diversity/equity training and education modules for green industry leaders, as a first step to address discriminatory stereotyping in green industries, particularly against workers with barriers to entry.
- Advocating for public and philanthropic grants to support diversity hiring initiatives within the private and public sectors to increase minority representation in existing and emerging cleantech businesses.
- Requiring project labor agreements and community benefit agreements for green infrastructure projects wherever possible to leverage public dollars and incorporate inclusive hiring practices.
- Funding workforce development programming which targets underrepresented communities via targeted outreach programs, paid internships and apprenticeships, and grants and scholarships.
- Incorporating soft skill training in green workforce development programs as well as wraparound resources, including childcare, transportation access, broadband access to better serve populations who face barriers to entry.
- Increasing sustained outreach and data tracking in green training to address recruiting and hiring bias among companies that have not yet hired from disadvantaged communities.

### 4 | Clearly Define Green Jobs and Track Metrics

Improve evaluation of green industry performance metrics at the state and federal level to better target workforce training investments and track progress by:

- Urging the Biden Administration and Congress to renew funding to update the Bureau of Labor Statistics (BLS) industry and occupational green jobs definitions and the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) codes to better align with current and emerging cleantech industries.
- Urging the Biden Administration and Congress to renew funding for updating the national quantitative measurement of Green Jobs (i.e., Green Goods and Services (“GGS”) Occupations study--based on 2011 data-- released by the Bureau of Labor Statistics in 2013), to track the pace of the greening of the economy nationally and regionally.
- Conducting a new and California-specific Green Goods and Services (“GGS”) survey to gather information about regional and statewide industry strengths.



President Joe Biden at LACI 2015

With the start of the Biden-Harris Administration, there will be even more opportunities to foster green jobs and economic recovery. President Joe Biden and Vice-President Kamala Harris’ Clean Energy Revolution and Environmental Justice Plan tackles climate change through investment in energy and climate research and innovation, as well as clean and resilient infrastructure and communities. Specifically, \$400 billion will be earmarked over ten years to spur economic growth and support new green jobs, creating more than 10 million good paying green jobs across the nation. The plan will also pursue partnerships with community colleges, unions, and the private sector to develop programs to support the training and development of America’s green workforce. As part of this transition, the plan will ensure incumbent workers from coal and oil industries secure their earned benefits and receive a just transition into the green economy. The Administration has moved to rejoin the Paris Climate Agreement to avoid perilous climate change by reducing global greenhouse gas emissions.<sup>3</sup>

With strategic investments, including federal stimulus funding, Los Angeles County is well-poised to create a new model for a greener, more equitable economy.

3. “Biden Plan for a Clean Energy Revolution & Environmental Justice”. Biden Harris. Accessed December 28, 2020. <https://joebiden.com/climate-labor-fact-sheet/>

# INTRODUCTION

Los Angeles is a national leader in the green economy. Sustainability-focused enterprises have taken off in greater Los Angeles thanks to progressive environmental policy, climate-conscious consumers, a talented and diverse labor pool, and the successful pivoting of legacy industries. Today, Southern California is home to 43 percent of California's zero-emissions vehicle (ZEV) jobs and boasts the second most comprehensive EV charging network in the country.<sup>4 5</sup> Los Angeles leads the nation with the most solar energy production of any U.S. city, making clean energy prominent.<sup>6</sup> Green building codes have made California a leader in building decarbonization and energy efficiency, with local policies in Los Angeles setting the pace for upgrading existing buildings. Growing green industries, coupled with large public investments in green infrastructure like Measures M and W, are laying the foundation for a new economy centered on sustainability and climate resilience.

4. Los Angeles County Economic Development Corporation. "Energizing an Ecosystem: The Electric Mobility Revolution in Southern California." March 2020.

5. "ChargePoint Announces the Nation's Top 10 Cities for EVs." ChargePoint. Accessed June 18, 2020. <https://www.chargepoint.com/about/news/chargepoint-announces-nations-top-10-cities-evs/>.

6. Pforzheimer, Adrian, et al. "Shining Cities 2020: The Top U.S. Cities for Solar Energy." Environment America Research & Policy Center and Frontier Group. June 2020.

The COVID-19 pandemic and the ensuing economic recession are threatening the Los Angeles region's green industries. The world has experienced unprecedented economic, social, and public health challenges in 2020. The COVID-19 pandemic and the ensuing economic recession have led to job losses across the nation and green industries have been hit harder than other industries. For example, 620,000 of 3.4 million national clean energy jobs (18%) were lost between February and May 2020, higher than the 13 percent decline recorded for all jobs. Los Angeles County's clean energy sector has been hit particularly hard, losing 18,700 of its jobs (20%) during this time period, the most of any county in the nation.<sup>7 8</sup>

To support sustainable economic growth and an equitable recovery, the greater Los Angeles region, state of California, and federal government must invest in Green Jobs. Investment in green industries will not only reduce greenhouse gas emissions, but can create a platform for inclusive and sustainable job growth, particularly in environmental justice communities where residents (typically low-income and of color) still grapple with the inequitable zoning and placement of environmental hazards. The green economy can address climate change, create high-road jobs, and begin repairing communities disenfranchised by the fossil fuel economy.

Public and private sector leaders must unite now to ensure that the post-COVID recovery bolsters a Southern California economy that is greener, more inclusive, and more resilient. In addition to state and local efforts, federal funding will set the pace and direction of economic recovery. LACI's Transportation Electrification Partnership has proposed a federal stimulus of \$150 billion -- sized for a \$2 trillion overall infrastructure stimulus package -- and frames the kind of economic recovery plan that prioritizes manufacturing, charging stations, utility upgrades, innovation, transit, equity, and workforce training. After the 2008 economic crash, the American Reinvestment and Recovery Act invested billions in clean energy, accelerating industries like solar and wind power in California which have since experienced explosive growth. An investment of a similar scale today in emerging green industries like zero emissions transportation could have a similar catalytic effect. Decisions happening now at the local, state, and federal level will create a foundation for the next phase of economic growth, and moreover, shape the future of sustainability in the country.

7. Phillip Jordan. "Clean Energy Employment Initial Impacts from the COVID-19 Economic Crisis, May 2020." BW Research. June 15, 2020. <https://e2.org/wp-content/uploads/2020/06/Clean-Energy-Jobs-May-COVID-19-Memo-Final.pdf>.

8. Long, Heather, Eli Rosenberg. "Unemployment Rate Drops and 2.5 Million Jobs Added, after States Reopened." The Washington Post. WP Company, June 6, 2020. <https://www.washingtonpost.com/business/2020/06/05/may-2020-jobs-report/>.



## LA's Green New Deal and OurCounty Sustainability Plan

Driven by ambitious local, regional, and state emission reduction targets, Los Angeles County continues to build a robust green economy. **LA's Green New Deal** and **OurCounty Sustainability Plan** demonstrate commitment to the Paris Climate Agreement, aim to create substantial job growth, and focus on equity and inclusion in the green economy.

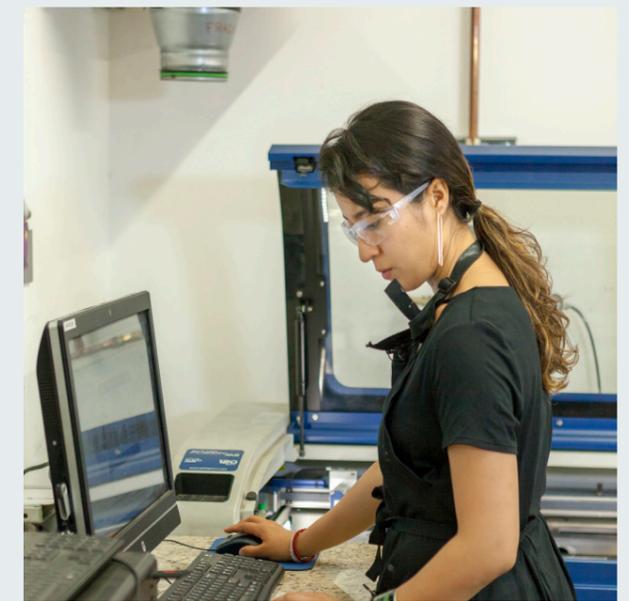
- The updated Sustainable City plan first released in 2015 and refreshed in 2019 (aka, **LA's Green New Deal**) outlines 13 focus areas to incorporate sustainability within all aspects of the City and the economy, covering topics like environmental justice, electric vehicles and charging, green housing and development, energy efficiency, local water, clean and healthy buildings, and food systems. Targets, milestones, and initiatives are included for each focus area; for instance, the plan targets creating 400,000 green jobs by 2050. The report further highlights partner initiatives and organizations that are working in sustainability throughout the City, thereby serving as a comprehensive and coordinated call to action for Los Angeles to combat climate change.
- Los Angeles County's **OurCounty Sustainability Plan** regionally unites all County residents under a shared vision for sustainability. The plan sets 12 broad goals, 37 long-range strategies to help meet those goals, and 159 actions, policies, and programs that will support the implementation of each strategy. Each goal addresses a different aspect of sustainability within the county, including equitable and sustainable land use, public health, affordable and clean transportation, and transparent governance. The plan targets 30,000 job placements by 2025; 100,000 job placements by 2035; and 200,000 job placements from County workforce development programs by 2045.



# ABOUT THIS REPORT

This report is intended to 1) Assess, analyze, and characterize Green Jobs overall and in greater Los Angeles; 2) Lay forth a course of action to grow an economy in Los Angeles that is greener, stronger, and more inclusive; and 3) Identify the workforce investment needs to support the opportunities identified. The study analyzes the existing green economy in the County, identifying strengths that can be leveraged and weaknesses that should be addressed. This study estimates the current size of the green workforce using data from the Bureau of Labor Statistics (BLS) and California Employment Development Department (EDD), then uses a sensitivity analysis to project growth to 2050. The study is also informed by ten individual interviews with workforce training programs to understand the unique challenges and opportunities of workforce training organizations in Los Angeles, and to develop recommendations for training the future green workforce. Further information on the report's methodology and additional data can be found in a Technical Appendix.

This study was commissioned by The **Los Angeles Cleantech Incubator (LACI)**, whose mission is to create an inclusive green economy. LACI is a City of Los Angeles-established nonprofit organization, focused on creating an inclusive green economy by: unlocking innovation through working with startups to accelerate the commercialization of clean technologies; transforming markets through partnerships with policymakers, innovators and market leaders in transportation, energy and sustainable cities; and enhancing communities through workforce development, pilots and other programs. Founded as an economic development initiative by the City of Los Angeles and its Department of Water & Power (LADWP), LACI is recognized as one of the most innovative business incubators in the world by UBI. In the past eight years, LACI has helped 220 companies raise \$465M in funding, earn \$270M in revenue, create an estimated 2,100 jobs, and deliver more than \$470M in long term economic value.





# GREEN JOBS IN LOS ANGELES COUNTY TODAY

Approximately one in twelve jobs in Los Angeles County today (338,000) is part of the County's green economy.<sup>9</sup> The green economy is comprised of both Green Jobs and green-related jobs. Green Jobs, which number 178,000, are either in businesses that directly produce green goods or services or jobs in traditional businesses that are directly responsible for making their establishments more environmentally friendly. Green Jobs support additional employment through their supply chains and from household spending by the employees within the supply chain. These additional green-related jobs account for the remainder of employment within the green economy.



## Defining Green Jobs

There is no universal consensus on a green jobs definition and, more importantly, there has been a lack of standardized data to measure the green economy since the discontinuation of the Bureau of Labor (BLS) statistics Green Goods and Services survey in 2011. For the purpose of this report, Green Jobs are defined either as jobs in businesses that produce green goods or services, or jobs in traditional businesses that are responsible for making their establishment's production process more environmentally friendly.<sup>10</sup> Additionally, this report captures a broader brush of the green economy with green-related jobs defined as both indirect and induced jobs resulting from these direct Green Jobs.

**Green Jobs exist in nearly every industry in Los Angeles County.** Jobs in cleantech industries, defined in this report as LACI's three focus areas of Clean Energy, Zero Emissions Transportation, and Smart and Sustainable Cities<sup>11</sup>, comprise almost 40 percent of all Green Jobs in Los Angeles County (See Figure 1). Outside of these cleantech industries, other types of green manufacturing comprise the largest part of the current green economy in Los Angeles County (18 percent), which includes the development and manufacturing of sustainable building materials and system and energy efficient appliances. Green Jobs can also be found in sectors not traditionally thought of as "green," including prevalent conventional County industries (e.g., entertainment, healthcare, and education), and jobs in environmental compliance and advocacy.

9. To calculate the number of Green Jobs, HR&A replicated the 2011 Bureau of Labor Statistics ("BLS") Green Goods and Services ("GGS") approach, which established a "green" percentage for each 6-digit NAICS code. First, a baseline of 2018 jobs in LA County was established for all NAICS codes. Then, each industry's share of green jobs was pro-rated based on their BLS GGS percentage. Industry codes were then grouped and combined with sociodemographic data to characterize the green economy.

10. Sommers, Dixie. "BLS Green Jobs Overview." U.S. Bureau of Labor Statistics. January 2013.

11. Smart and Sustainable Cities as an area of focus for LACI is defined as water efficiency and circular economy with emphasis on supporting solutions that will help Los Angeles achieve zero waste by 2050.

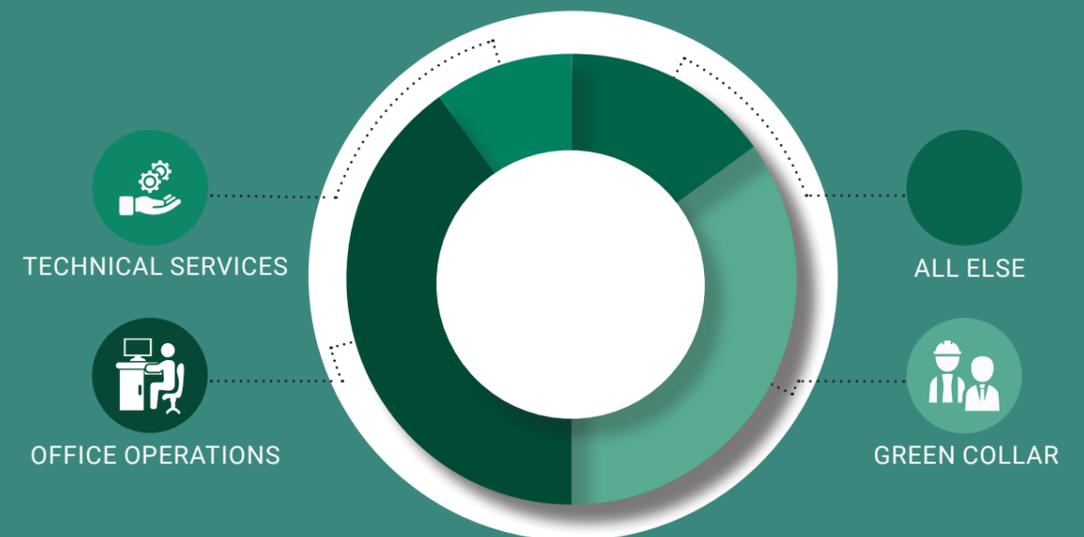
The majority of Green Jobs are made up of occupations not typically thought of as "green". "Green Collar" occupations, which are blue collar production jobs in green industries, make up approximately 40 percent of Green Jobs (See Figure 2). These Green Collar occupations include jobs typically thought of as green such as constructing green infrastructure and energy efficient buildings or maintaining and operating green technology. In contrast, 60 percent of Green Jobs are in fields not necessarily thought of as "green," including office operations, scientific and technical services, and other fields like education.

Figure 1: Green Jobs by LACI's Priority Area Sectors



SOURCE: EMSI, HR&A

Figure 2: Green Jobs by Occupation Categories





**“On average, Green Jobs are high-road jobs which typically have better pay and benefits than the average Los Angeles County job, while offering upward career mobility and safe workplaces.”**

On average, Green Jobs are high-road jobs which typically have better pay and benefits than the average Los Angeles County job, while offering upward career mobility and safe workplaces. Green Jobs pay approximately \$28 per hour on average, which is 12 percent more than the County average (\$25). More advanced and technical Green Jobs (e.g., civil engineers and software developers) pay well above the County rate, averaging \$45 per hour. With the appropriate training, Green Collar jobs, which do not require a bachelor’s degree, can also pay well above the County average, with many trades averaging pay above \$40 per hour upon completion of an apprenticeship. Green Jobs also have generally higher benefit packages, partially because many jobs in construction, sanitation, and electricity are union jobs.

## Electrical Training Institute

**Electrical Training Institute:** The Electrical Training Institute carries out training for the National Electrical Contractors Association and International Brotherhood of Electrical Workers. Upon completion of an apprenticeship, which can range from 4,800 to 8,000 hours, many of its electrical tracks guarantee pay upwards of \$48 per hour.

**Moreover, Green Jobs are available at all levels of education.** On average, 75 percent of Green Jobs are accessible without a bachelor’s degree. Green Collar jobs are the most accessible type of Green Job, as 99 percent of these jobs do not require a bachelor’s degree. Due to these low educational requirements, many positions require apprenticeships, training programs, and on-the-job training to help workers cross the skills gap to perform green work (See Table 1).

**Table 1: Green Job Training and Education Requirements by Sector**

	SELECT OCCUPATION	ENTRY LEVEL EDUCATION	TRAINING
GREEN ENERGY	<b>Electricians</b>	High school diploma or equivalent	Apprenticeship
	<b>Carpenters</b>	High school diploma or equivalent	Apprenticeship
	<b>Solar Photovoltaic Installers</b>	High school diploma or equivalent	Moderate-term on-the-job training
	<b>Construction Laborers</b>	No formal educational credential	Short-term on-the-job training
	<b>Wind Turbine Service Technicians</b>	Postsecondary nondegree award	Long-term on-the-job training
	<b>Electrical Power-Line Installers and Repairers</b>	High school diploma or equivalent	Long-term on-the-job training
ZERO EMISSIONS TRANSPORTATION	<b>Battery Assemblers and Fabricators</b>	High school diploma or equivalent	Moderate-term on-the-job training
	<b>Machinist</b>	High school diploma or equivalent	Short-term on-the-job training
	<b>Bus Drivers</b>	High school diploma or equivalent	Short-term on-the-job training
	<b>Heavy and Tractor-Trailer Truck Drivers</b>	Postsecondary nondegree award	Short-term on-the-job training
	<b>Light Truck or Delivery Services Drivers</b>	High school diploma or equivalent	Short-term on-the-job training
	<b>Laborers and Freight Movers</b>	No formal educational credential	Short-term on-the-job training
	<b>Construction Laborers</b>	No formal educational credential	Short-term on-the-job training
SMART AND SUSTAINABLE CITIES	<b>Refuse and Recyclable Material Collectors</b>	No formal educational credential	Short-term on-the-job training
	<b>Hazardous Materials Removal Workers</b>	High school diploma or equivalent	Moderate-term on-the-job training
	<b>Construction Laborers</b>	No formal educational credential	Short-term on-the-job training
	<b>Plumbers, Pipefitters, and Steamfitters</b>	High school diploma or equivalent	Apprenticeship
	<b>Heavy and Tractor-Trailer Truck Drivers</b>	Postsecondary nondegree award	Short-term on-the-job training

Note: occupations are exemplary and not exclusive to each focus area.  
Source: Esmi

# ENSURING AN EQUITABLE GREEN ECONOMY



**More work is needed to drive change and advance equity goals so that all can benefit from the emergence of the green economy and Los Angeles' new green jobs.** While people of color are underrepresented when looking at both the green economy and the overall economy, women are underrepresented in the green economy but are not underrepresented when looking at the overall economy (which is about 50% female). There is an opportunity to lead the way to ensure green jobs provide more upward mobility for women and people of color than other sectors of the economy.

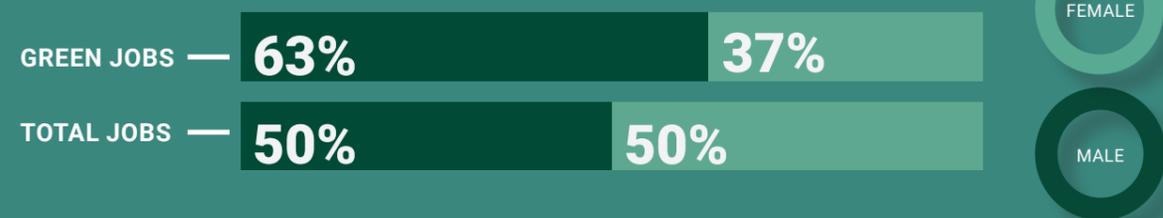
**37 percent of Green Jobs are held by women,** although women hold half of all jobs in Los Angeles County (See Figure 3). Research has linked this gender disparity to historic exclusion from blue-collar apprenticeships and STEM education programs.<sup>12</sup> Green Collar jobs, which make up 40% of Green Jobs, are more focused on construction, production, and maintenance, and women are typically underrepresented in these fields. This problem is not unique to Green Jobs, as there are similar disparities in other production industries. For instance, women only make up 21 percent of countywide jobs in Oil and Gas Extraction in the County.

**“There is an opportunity to lead the way to ensure green jobs provide more upward mobility for women and people of color than other sectors of the economy.”**

12. Muro, Mark, et al. “Advancing Inclusion Through Clean Energy Jobs.” Brookings Metropolitan Policy Program. April 2019.

13. The Hispanic/Latinx category includes all individuals identifying as Hispanic per the Census’ Quarterly Workforce Indicators and the American Community Survey.

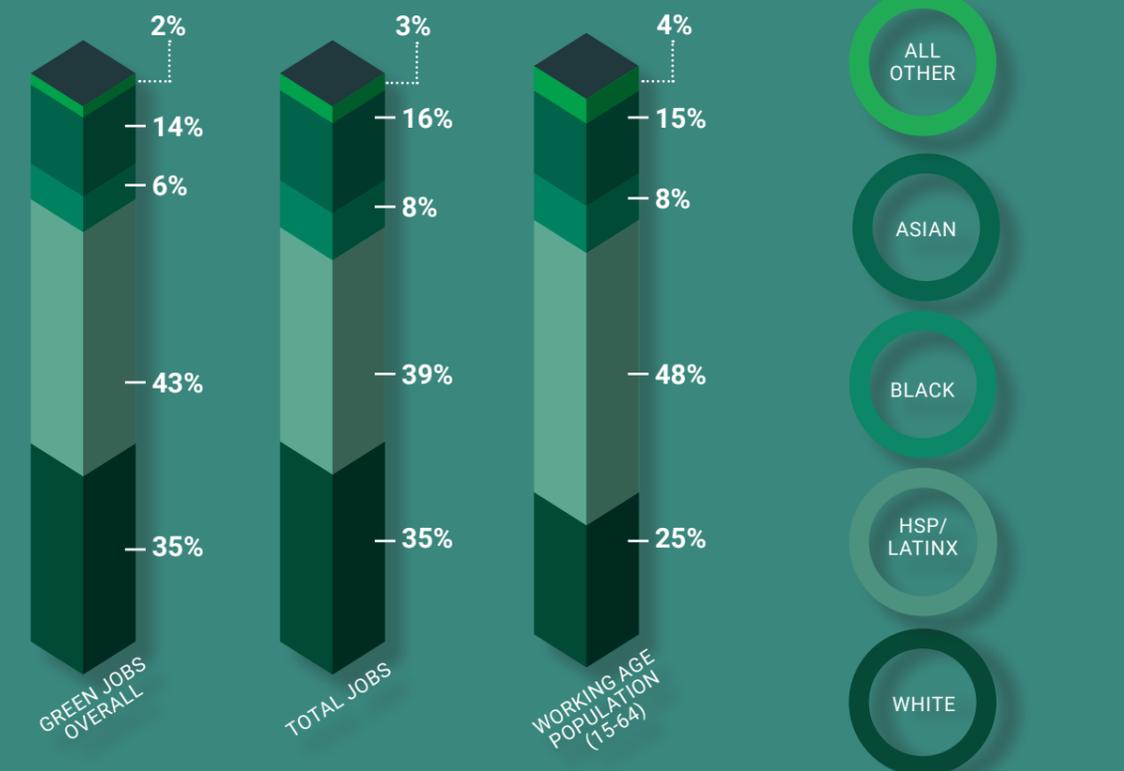
**Figure 3: Green Jobs in Los Angeles County by Gender**



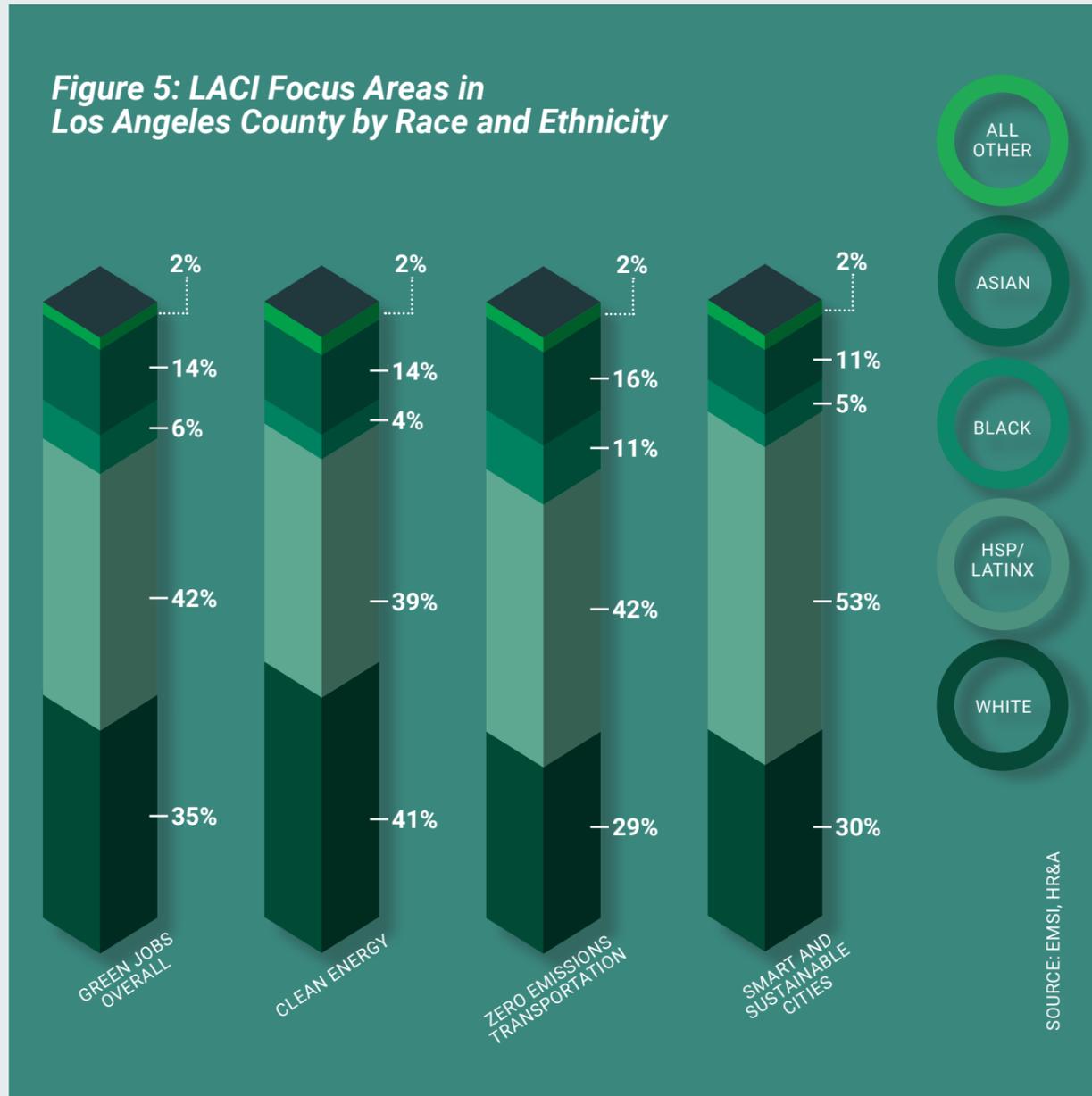
**Further, people of color hold 65 percent of Green Jobs, and 65 percent of total jobs, despite comprising 75 percent of the County’s working-age population.** This underrepresentation highlights systemic racial disenfranchisement in the overall economy as well as the nascent green economy. Green jobs perform better than the overall County economy in terms of employing Hispanic/Latinx workers (See Figure 4), but still need to make strides to overcome the systemic inequities of today’s economy to build a workforce that equitably reflects the County working population as a whole.

**White workers hold a disproportionate share of high paying technical Green Jobs positions,** a similar theme for other sectors including technology, business, and architecture. For instance, white workers are overrepresented in Clean Energy, which pays \$8 more per hour than the County average (\$25 per hour) and has a higher requirement for bachelor’s degrees (35 percent

**Figure 4: Green Jobs in Los Angeles County by Race and Ethnicity<sup>13</sup>**

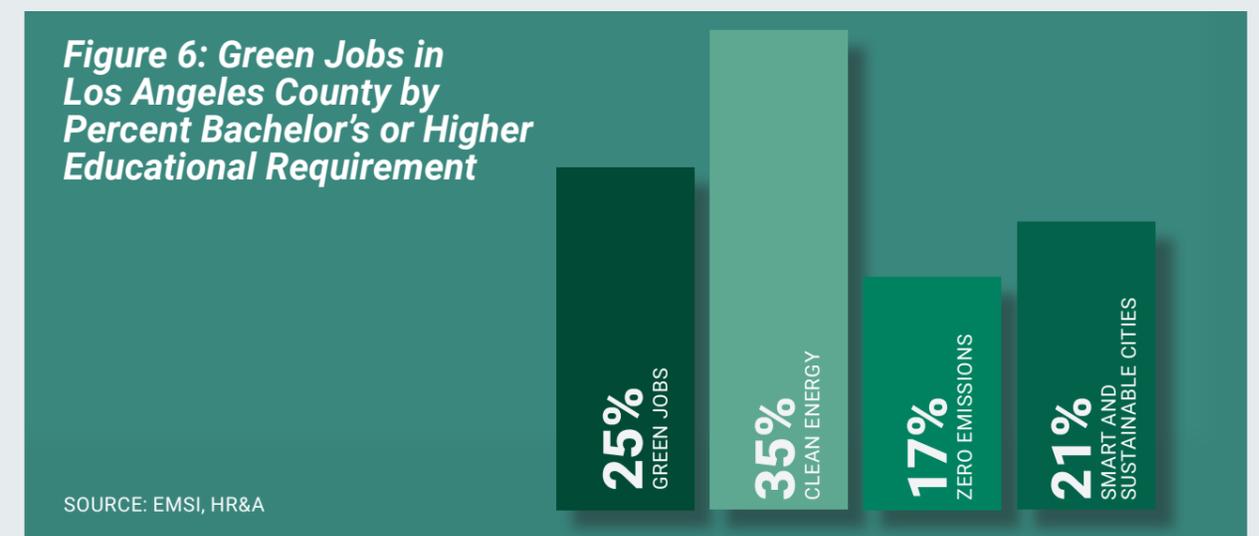


SOURCE: EMSI, HR&A



The Los Angeles region can be at the forefront of helping the green economy outperform the overall economy by advancing initiatives around equity and inclusion in the green economy. One of the core principles of the City of Los Angeles’s Green New Deal is growing an inclusive economy to promote equity, and each of the plan’s 13 topic areas specifically highlight equity initiatives. In OurCounty Sustainability Plan, the County of Los Angeles highlights environment, equity, and economy as coequal values and tags actions throughout the plan which further equity

versus 24 percent). In contrast, Black and Hispanic/Latinx workers are overrepresented in Green Jobs that do not require college degrees. For instance, these populations are overrepresented in Zero Emissions Transportation, which pays roughly equal to the County average and only requires a bachelor’s degree for 17 percent of jobs (See Figure 6). The underrepresentation of people of color in high paying Green Jobs has been linked by research to barriers to higher education access, and may also be the result of bias in hiring and recruiting practices.<sup>14</sup> For Black workers specifically, research has identified a persistent underrepresentation in construction and manufacturing sectors, which are increasingly becoming green; this is historically linked to decreased unionization and insufficient requirements with local and targeted hiring programs.<sup>15</sup>



12. Muro, Mark, et al. "Advancing Inclusion Through Clean Energy Jobs." Brookings Metropolitan Policy Program, April 2019.

13. Waheed, Saba, et al. "Ready to work: Uprooting Inequity." UCLA Labor Center, Los Angeles Black Worker Center, UCLA Institute for Research on Labor and Employment, March 2017.

goals. Key equity topics across both plans include reducing disadvantaged community exposure to environmental pollutants, equitably allocating green infrastructure projects, providing funding for low-income residents to green their properties, increasing affordable housing in transit- and job-rich areas, and increasing access to education and workforce training opportunities for underrepresented communities.

While the City and County have made significant progress to meet these goals, the murder of George Floyd and resulting national reckoning – with the Black Lives Matter movement at the fore noting historic barriers like redlining and access to capital, as well as barriers for Latinx, women, and other populations – has highlighted the need to prioritize equity in rebuilding our economy, improving access to capital, and focusing on training and hiring. Given the findings of this study, one of the four key recommendations is to build equity and inclusion into green industries through policy interventions and more holistic and targeted workforce training and outreach (see “Recommendation #3: Advance Equity and Inclusion” on p. 60 for additional details).



## LACI Initiatives

LACI supports an inclusive green economy with programs targeting underrepresented groups. Programs include:



### Green Workforce Training Program

LACI’s Advanced Prototyping Center (APC ) Fellowship Program is a workforce training program for underrepresented groups and provides technical training, interpersonal skills, and industry-recognized certifications to help increase inclusivity in the green economy. Key aspects include a technical bootcamp, career fair, and ongoing career coaching. The most recent cohorts have focused on transportation electrification, including EVSE Technician Training.



### Women in Cleantech

Women in Cleantech is focused on empowering women and influencing institutional change by directly addressing women’s challenges and opportunities to lead in the green economy. Key program components include monthly coffee meetups and quarterly workshops.



### Middle School Girls Program

The goal of the Middle School Girls Program is to engage middle school girls across Greater Los Angeles in exploring new STEM + Sustainability career pathways, inspiring girls around prototype development, community engagement, and ultimately, solutions for global climate change.

13. Muro, Mark, et al. “Advancing Inclusion Through Clean Energy Jobs.” Brookings Metropolitan Policy Program. April 2019.

14. Waheed, Saba, et al. “Ready to work: Uprooting Inequality.” UCLA Labor Center, Los Angeles Black Worker Center, UCLA Institute for Research on Labor and Employment, March 2017.

# EXISTING WORKFORCE TRAINING LANDSCAPE



Image Source Bernadette Fox for LA Conservation Corps

**Workforce training is essential to supporting a strong Los Angeles County green economy.** Los Angeles County green businesses report a shortage of qualified labor despite low barriers to entry and a variety of training programs. Green businesses need workers who have the right mix of green technical skills, professional soft skills, and knowledge and competence in STEM disciplines, which can be challenging to find. Businesses in cleantech have also emphasized that workers need to understand basic computer programming and/or software development given the integration of tech into many of today's green innovations. Effective green workforce training programs that adequately teach these skills and competencies are critical to strengthening Los Angeles's regional advantage in green industries, connecting workers to both well-established local clusters (such as solar photovoltaics) and preparing them for emerging ones (such as electric vehicles).

**Currently, Los Angeles County incorporates green training into general workforce training and career technical education (CTE) programs.** Community colleges currently train the largest share of workers, as over 70 percent of community colleges currently offer degrees, certificates, or courses in green fields. City and County workforce development agencies have developed training in support of green public investments, while many non-profits help connect green training resources to populations with barriers to employment. Many companies have developed in-house training models or have developed custom training curriculum in partnership with local workforce development programs. In-house training programs are likely to be challenged during the economic downturn as companies defer hiring and manage cashflow.

**Workforce development organizations need to overcome several key challenges in order to grow the talent pipeline.** Program administrators, including community college representatives and non-profit leaders, expressed concerns about low Green Job placement rates; at the same time, green businesses noted they frequently hire entry-level workers and complete all training in-house.<sup>16</sup> In general, workforce programs struggle to stay up to date with changing industry needs and emerging job pipeline opportunities--the same is true for green job training which lag

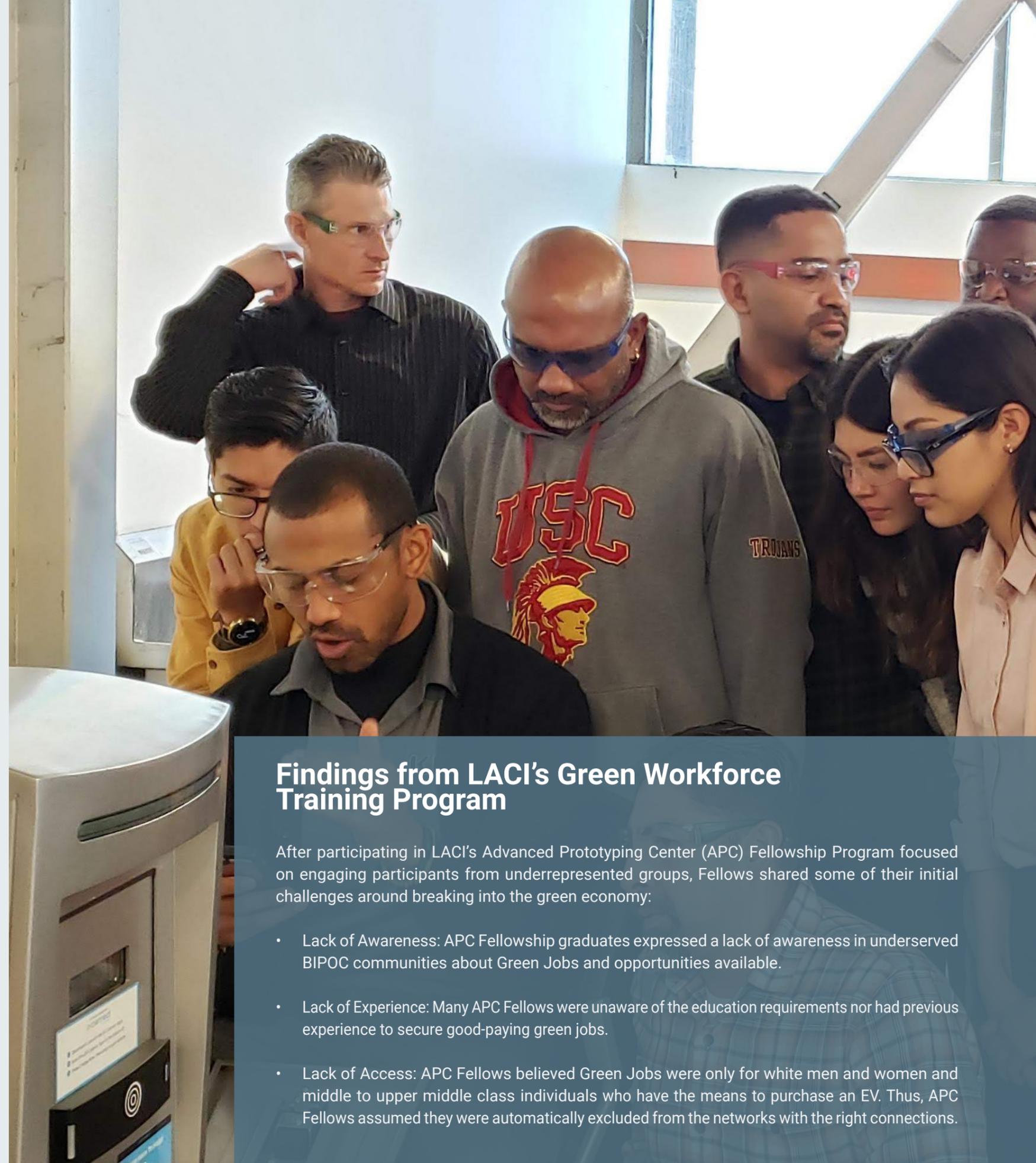


behind trends for EV manufacturing, repairs, charging installation, and clean energy jobs. There is a need to strengthen connections between firms that are hiring for green jobs and workforce partners, while creating common curricular standards that align with the talent pipeline. These challenges are exacerbated in cleantech industries, which face the most rapidly changing technology in fields like grid capacity, battery storage, and EV charging installation. Emerging technology has higher upfront cost and schools and organizations have legacy equipment tied to jobs not in high demand, which prevents hands-on education for many programs.

**Systematically investing in workforce training will create a more stable workforce pipeline for green industries.** Program administrators noted that inconsistency in year-to-year funding of their workforce programs limits the ability to both sustainably staff and grow green programs and invest in needed technologies. Year-to-year budget uncertainty impacts planning for future capital investments, such as machinery needed to effectively teach new skills that are expected to be in demand in the coming years like electric vehicle charging installation. With more resources, improvements can be made in the number of students and the quality of training provided.

**As the economy becomes greener, quality, well-resourced workforce programs can facilitate equitable workforce outcomes through effective retraining and retooling.** A 2019 Brookings report noted that over 320 different occupation types will be impacted by the transition to clean energy, and the same is true for other green industries as well.<sup>17</sup> Auto mechanics, for instance, will need knowledge in electric systems to service new electric vehicles. Likewise, traditional plumbers need to be trained on water-saving techniques to be qualified for in-demand LEED-certified projects.

**Los Angeles County must align its training programs to upskill workers for greening industries and help the region to capture a greater share of the national green economy going forward.**



## Findings from LACI's Green Workforce Training Program

After participating in LACI's Advanced Prototyping Center (APC) Fellowship Program focused on engaging participants from underrepresented groups, Fellows shared some of their initial challenges around breaking into the green economy:

- **Lack of Awareness:** APC Fellowship graduates expressed a lack of awareness in underserved BIPOC communities about Green Jobs and opportunities available.
- **Lack of Experience:** Many APC Fellows were unaware of the education requirements nor had previous experience to secure good-paying green jobs.
- **Lack of Access:** APC Fellows believed Green Jobs were only for white men and women and middle to upper middle class individuals who have the means to purchase an EV. Thus, APC Fellows assumed they were automatically excluded from the networks with the right connections.

16. A full list of interviewees can be made available upon request.

17. Muro, Mark et al. "Advancing Inclusion Through Clean Energy Jobs." Brookings Metropolitan Policy Program. April 2019.

## LACI Workforce Development Program Graduates



**Guillermo Villanueva**

APC Fellowship Program, Cohort One Graduate

After I finished the fellowship at LACI, I began to apply to jobs with the new skills and certifications that I earned during the program, including the OSHA 10 (workplace safety and health certification). When I landed the interview for UPS for engineering, they were very impressed that I had OSHA 10 and had knowledge in reading blueprints because of my training through Solid Professor. UPS is currently building new facilities to meet the rising demand of shipping packages. These new facilities have to be OSHA compliant. I was hired because of my knowledge of OSHA and the ability to learn new skills and working as a team. Currently, I am assisting in opening a new sorting plant in La Mirada, CA by overseeing the maintenance of the plant during sort time and making sure the building stays OSHA compliant while running efficiently. I want to thank the fellowship program for helping me get hired at UPS.



**James Jeon**

APC Fellowship Program, Cohort Three Graduate

Big shout out to Los Angeles Cleantech Incubator (LACI) for supporting me on achieving my Project Management Professional (PMP) certification. I am ready more than ever to take on new projects aimed to make a greener economy. Special thanks to all my instructors that supported me during my APC fellowship program and especially to my PMP instructor for being persistent on coaching me to achieving my certification!



**Anna Yung**

APC Fellowship Program, Cohort Two Graduate

My time in the LACI fellowship program is one I will never forget! Learning at LACI alongside like-minded individuals opened up a whole new world to me in the clean tech space and I was able to walk away from the experience with such valuable information as well as a new knowledge set. Although I haven't continued working directly with EVSEs, there are so many facets to the EVSE industry that you can really tap into whatever it is that inspires and excites you and take it in a direction that is meaningful to you. After the fellowship program I was fortunate enough to receive the opportunity to intern with Verdical Group, one of the La Kretz Innovation Campus Members, as marketing and events intern. My time in the fellowship has helped me to thrive in the green industry. Hearing the passion that other people have for what they do is so inspiring and will inspire future participants in whatever career goals they may have for the future.



**Clyde Ellis Jr.**

APC Fellowship Program, Cohort Two Graduate

I thank LACI for the opportunity to participate in the EV Network Technician Training. Since participating in the APC Fellowship Program, I had the chance to learn about the benefits of Electrical Vehicles and maintenance of the charging stations. I worked in all the local oil refineries in the city. And, I worked there to support my family. Now, since I know more about clean tech, I'm excited to go back to my community and surrounding areas and educate them on the benefits of clean technology.



# THE OPPORTUNITY FOR A GREEN FUTURE

Investing in a green economy provides multiple benefits—economic, health, and environmental—and, ultimately, makes greater Los Angeles more resilient to the ongoing COVID pandemic and future economic downturns. Green goods and services are increasingly in demand across the world, driven by policies and changing consumer preferences. Early movers in emerging green technologies are likely to have greater market success and will generate more jobs if they are backed by supportive public and institutional sectors. Investing in vital infrastructure for sustainable growth, such as a network of public chargers for medium- and heavy-duty EVs, will help California open up new markets, encouraging more local innovation and investment, and therefore, more jobs. Green Jobs are also shown to have a high jobs multiplier effect, meaning more supply chain jobs will be created. This is critical in the context of a recession when many jobs in service industries like retail have been lost.

## LACI STARTUP JUMPWatts

JumpWatts, a Los Angeles-based startup, aims to help reduce unproductive labor and high carbon emissions for shared e-scooter and e-bike fleets due to manual fleet logistics. JUMPWatts has developed the Virtual Valet, a sleek, easy to install kit to enable: repositioning, vehicle stand up, enhanced safety, and parking compliance remotely, through teleoperation service; all while working hand-in-hand with communities and city regulators to bring smarter micromobility to market.



### **Investments in green infrastructure are cost-effective opportunities to generate new jobs.**

Green infrastructure spending creates more jobs per dollar than traditional infrastructure investments, with every \$1.0 million in spending on renewable energy creating 7.49 full-time jobs compared to only 2.65 for investments in fossil fuels.<sup>18</sup> In addition, every \$1.0 million invested in transportation electrification could create up to 15 jobs. Moreover, many of these investments are shovel ready and, in some cases, can be accelerated with adequate political will. For example, due to decreased traffic from COVID-19, the City of Beverly Hills voted to accelerate construction of the Metro Purple Line.

18. Hepburn, Cameron et al. "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?," Smith School Working Paper 20-02. May 4, 2020.

19. Gerdes, Justin. "2020 Looks Like the Breakout Year for Building Decarbonization in California." Greentech Media. August 23, 2019. [www.greentechmedia.com/articles/read/2020-looks-like-the-breakout-year-for-building-decarbonization-in-california](https://www.greentechmedia.com/articles/read/2020-looks-like-the-breakout-year-for-building-decarbonization-in-california)

20. Jones, Betony, et al. "California Building Decarbonization: Workforce Needs And Recommendations." UCLA Luskin Center for Innovation. November 2019. <https://innovation.luskin.ucla.edu/california-building-decarbonization/>

**Green jobs contribute to a greener future with innumerable positive impacts to Angelenos.** In addition to slowing global climate change, moving towards decarbonized buildings, cleaner vehicles, and local water will reduce fire risk and generate cleaner air, water, and land. From a social benefit perspective, Green Jobs, with lower educational requirements than average, are highly accessible and can be positioned to benefit environmental justice communities who have long suffered from pollution and poor air quality; in particular, Black and Latinx communities have historically been subjected to the combination of rising housing prices and gentrification as well as the historical racist practices of redlining, freeway development, and allowing siting of major polluters near residential areas. Green investments can also help to make people less susceptible to respiratory illnesses like COVID-19 in the future (through cleaner air) and reverse the trend toward more frequent and severe pandemics caused by climate change and environmental degradation.

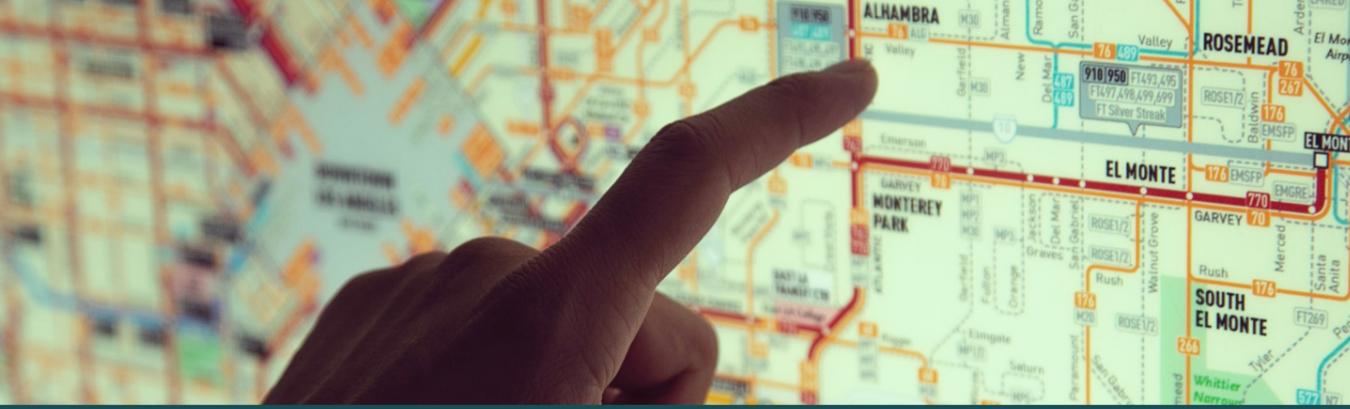


## INDUSTRY SNAPSHOT

### *Building Decarbonization*

Building decarbonization has a broad objective, striving to both change the type and amount of energy used by buildings. A major aspect of building decarbonization is building electrification, with all components of buildings functioning off of a clean energy portfolio. California's progressive building standards will ensure new homes are fully electrified. However, the majority of electrification work will occur in the retrofitting of existing residential and commercial buildings. Policies, such as the California Public Utilities Commission's 2019 decision to allow utilities to offer incentives for customers to switch from natural gas using appliances to electric models (e.g., heat pumps), will help incentivize the retrofit process.<sup>19</sup>

Building decarbonization will necessarily engage the construction industry, which employs nearly 150,000 workers. The building trades, including electricians, carpenters, and HVAC technicians stand to gain from the transition to electrified buildings, whereas plumber and pipefitters may decline with less demand for gas lines and hookups.<sup>20</sup> These positions, all of which pay at or above the countywide median wage, are accessible to individuals without a bachelor's degree and are supported by established training and apprenticeship programs.



## Measure M and Measure W

Los Angeles County has made a number of recent public commitments to green infrastructure spending. Measure M and Measure W represent two of the largest of these public investments. Anticipated job impacts from these measures are considered in this study's projection of future growth.

### MEASURE M

This measure was passed by Los Angeles County voters in November 2016 to increase the County sales tax by a half-cent to fund transportation projects. Measure M is expected to generate \$860 million annually and approximately \$120 billion in funding over 40 years.<sup>21</sup> This measure will fund Los Angeles County's most ambitious transportation plan in history, including over \$26 billion to new rail and bus lines and safer streets for cyclists and pedestrians.

### MEASURE W

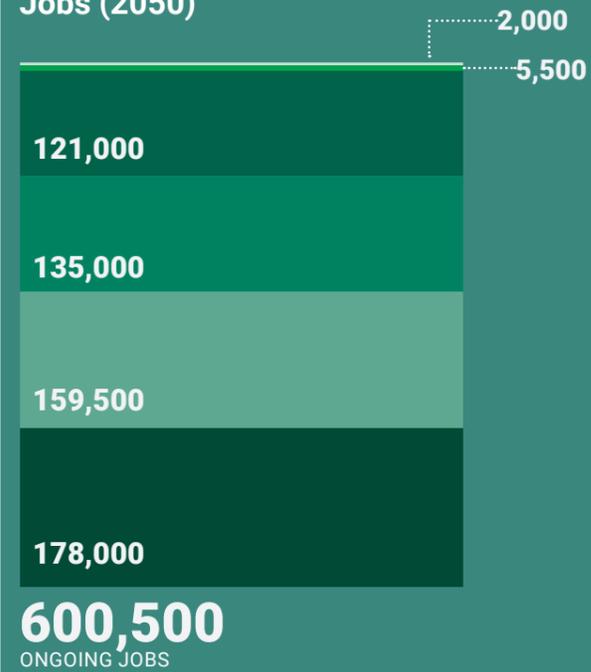
This measure was passed by voters in November 2018 and levies an additional parcel tax to fund the capture and cleanup of stormwater throughout Los Angeles County. Measure W is expected to generate \$285 million annually without a sunset provision, 85 percent of which will go directly towards new stormwater infrastructure throughout the County, creating green jobs as well as more local water supply. Instead of sending water from storm events as quickly as possible to the ocean, we will capture the water, clean it up, and store it for future use.<sup>22</sup>

**Los Angeles's green economy could grow considerably in the coming decades should public and private leaders acknowledge these benefits and take action.** By 2050, HR&A estimates that Los Angeles County could create up to 600,000 jobs in the green economy, a nearly 80 percent increase from today, including 320,000 Green Jobs (see Figure 7). This growth is double the rate for all jobs, which are expected to grow 40 percent over the same time period. This estimate accounts for anticipated growth in green industries, the transition of some existing jobs to Green Jobs, and additional jobs created by planned major green investments by the public sector. In addition to permanent full-time and part-time positions, public investments can also generate many construction jobs to build out Los Angeles County's green infrastructure. Measure M and Measure W alone are expected to generate 240,000 construction jobs by 2050.<sup>23 24</sup>

21. Los Angeles County Economic Development Corporation. "Construction Impact of Los Angeles County Traffic Improvement Plan." July 2016.  
 22. Los Angeles Alliance for a New Economy. "Liquid Assets: How Stormwater Infrastructure Builds Resilience, Health, Jobs, & Equity." 2018.  
 23. Los Angeles County Economic Development Corporation. "Construction Impact of Los Angeles County Traffic Improvement Plan." July 2016.  
 24. Los Angeles Alliance for a New Economy. "Liquid Assets: How Stormwater Infrastructure Builds Resilience, Health, Jobs, & Equity." 2018.

**Figure 7: Green Jobs in 2050**

### Los Angeles County Total Ongoing Permanent Jobs (2050)



- Measure W (Direct and Multiplier Jobs)
- Measure M (Direct and Multiplier Jobs)
- New Multiplier Jobs
- New Direct Green Jobs
- Existing Multiplier Jobs
- Existing Direct Green Jobs

### Los Angeles County New One-Time Construction Jobs (Cumulative 2018 - 2050)

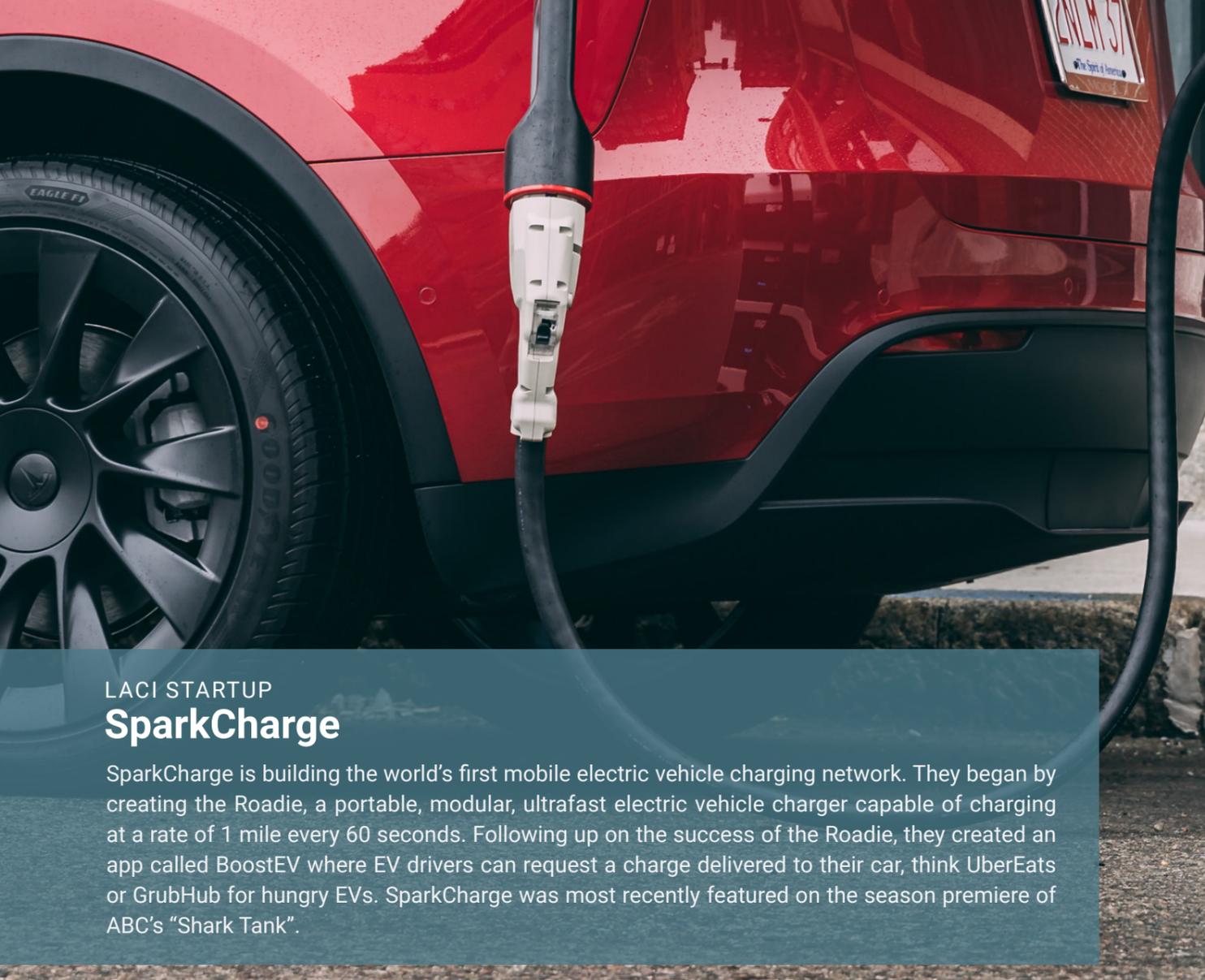


	Measure M <sup>8, 12</sup>	Measure W <sup>9</sup>
<b>Total Ongoing Jobs by 2050</b>	5,500	2,000
<b>Direct Jobs</b>	4,000	1,500
<b>Multiplier Jobs</b>	1,500	500
<b>One-Time Construction Jobs (2018-2050)</b>	228,500	7,500

SOURCE: EMSI, HR&A, LAANE

## Projecting Green Jobs in 2050

The methodology used to project Green Jobs in 2050 included consideration of industry growth projections, an anticipated greening of the economy, and market-transformative public investments. Similar to the methodology used to estimate current Green Jobs, the percentage of jobs considered green was applied at the industry-level to the anticipated job growth for Los Angeles County. This percentage was based on the BLS Green Goods and Services survey, and adjusted to anticipate a further greening of the economy. The Green Jobs in 2050 estimate includes both direct Green Jobs as well as additional employment at businesses in their supply chains and from household spending by these supply chain employees, i.e. "multiplier jobs". Finally, the ongoing impacts of Measure M and Measure W, two transformative green investments from the public sector, and their related multiplier jobs were added to estimate the total size of the Los Angeles County's green economy in 2050.



## LACI STARTUP SparkCharge

SparkCharge is building the world's first mobile electric vehicle charging network. They began by creating the Roadie, a portable, modular, ultrafast electric vehicle charger capable of charging at a rate of 1 mile every 60 seconds. Following up on the success of the Roadie, they created an app called BoostEV where EV drivers can request a charge delivered to their car, think UberEats or GrubHub for hungry EVs. SparkCharge was most recently featured on the season premiere of ABC's "Shark Tank".



## INDUSTRY SNAPSHOT

### EV Charging

According to LAEDC, zero emission vehicles (ZEVs) currently comprise 200,400 registered vehicles in California. By 2030 this number is expected to grow to 7.2 million vehicles. To support this explosive growth, electric vehicle charging stations will need to increase across the state. As of 2018, there were approximately 4,000 public EV charging stations in LA County. Based on ZEV growth, Los Angeles County will need 84,000 public and workplace chargers by 2028, and 130,000 by 2035.<sup>25</sup>

This massive investment in new EV infrastructure will provide many job opportunities, including EV Charger Technicians to install these chargers and Software Developers to create the systems to enable monitoring and regulation of the charging systems. These occupations are accessible for individuals holding different levels education and training and can pay very well. For instance, EV Charger Technicians have been noted to find jobs paying upwards of \$30.00 per hour.

Several opportunity sectors stand out as having strong potential to grow accessible Green Jobs in Los Angeles County, in particular for Green Collar jobs which should be the focus of workforce development initiatives within the County:

- **Zero emissions transportation.** Major planned investments in zero emissions public transit are happening, such as Metro's commitment of 100% EV buses by 2030 (with a goal of 2028 as part of the Transportation Electrification Partnership), and ambitious goals are being set around light-, medium-, and heavy-duty electric vehicles (e.g., Governor Newsom's Executive Order to eliminate sale of internal combustion engine vehicles by 2035). These initiatives and the requirement that all heavy duty drayage trucks to be zero emissions by 2035 align statewide the commitment of both Ports of Los Angeles and Long Beach's Clean Air Action Plan and Mayoral Joint Declaration. California will need workers to build out a massive network of publicly-available chargers.

25. Los Angeles County Economic Development Corporation. "Energizing an Ecosystem: The Electric Mobility Revolution in Southern California." March 2020.



- **Renewable energy.** Until the coronavirus hit, demand for clean energy in California was hitting an all-time high. Technological research and innovation have made solar and wind power cost competitive with fossil fuel sources, aided by both tax incentives and mandates for new construction. In recent years, homeowners in fire prone areas have increasingly sought out home solar and other microgrid power solutions to reduce fire risk. The market is expected to continue to grow for these technologies, and will require more workers in Green Jobs such as solar photovoltaic technicians, wind turbine technicians and machinists, electrical engineers, and solar sales consultants.
- **Energy storage and grid modernization.** Updating electrical grids within both urban and rural communities is critical to scaling up zero emissions transportation and maximizing the potential of renewable energy in off-peak hours. New battery technologies are also needed to support transportation electrification, especially for medium- and heavy-duty trucking, which cannot operate efficiently with lengthy or frequent charging requirements. There is also the potential to leverage the state's rich lithium resources available from the production of geothermal power at the Salton Sea to further drive battery innovations and clean energy more broadly. Important Green Jobs in this sector include battery design engineers, battery testing technicians, battery manufacturing technicians, smart grid engineers, and power system operators.

## INDUSTRY SNAPSHOT

### *Battery Storage*

Since solar and wind power generation are dependent on weather conditions and electricity usage is subject to demand rushes, battery storage is critical in supporting these investments to guarantee more consistent streams of energy. The cost of battery storage has fallen dramatically in recent years which will likely help further pairing of clean energy solutions with battery storage. For instance, the cost of lithium-ion batteries fell an estimated 73 percent between 2010 and 2017.<sup>26</sup> Additionally, California's progressive energy policies, such as the California Energy Commission's 2018 residential solar mandate, are likely to increase solar adoption. With one in five solar systems expected to be paired with battery storage, there is growing potential for battery storage across the state.<sup>27</sup>

This growth will create opportunities for Solar Technicians and Electricians to install batteries of varying complexity on single-family home to power generation facilities. Both positions are accessible to individuals without a bachelor's degrees and are supported by established training and apprenticeship programs.

26. Environmental and Energy Study Institute. "Fact Sheet: Energy Storage (2019)." 2019. <https://www.eesi.org/papers/view/energy-storage-2019>.

27. St. John, Jeff. "US Storage Market Rebounds as Outage-Scarred California Promises Big 2020 Growth." Greentech Media. December 3, 2019. [www.greentechmedia.com/articles/read/us-storage-market-rebounds-in-q3-as-calif-power-outages-loom-large](http://www.greentechmedia.com/articles/read/us-storage-market-rebounds-in-q3-as-calif-power-outages-loom-large).



## BYD

BYD is a global manufacturing company that employs hundreds of people at its facility in Lancaster, California where the company manufactures electric buses. In fall 2019, BYD launched a manufacturing apprenticeship program in Lancaster in partnership with Antelope Valley College and the union SMART Local 105. The program, called Industrial Manufacturing Technician Apprenticeship, is set to annually enroll around 40 students, with a curriculum that includes OSHA 10 safety training, manufacturing concepts, mathematics and techniques, and emerging trends in manufacturing, totaling 16.5 units of college credit. The program focuses on technical skill development in both classroom and hands-on training, including precision metal work and electrical wiring, training students to work in the electric bus manufacturing and assembly industry.

This training program was developed as part of a Community Benefits Agreement (CBA) between BYD and Jobs to Move America. It includes a critical focus on environmental justice, committing to recruiting and hiring 40 percent of workers from populations with significant barriers to employment.

- **Transit, water, infrastructure, construction and building trades.** New building codes, tax incentives, and public investment in green infrastructure are pushing a green transformation in the construction industry. Construction workers are needed to install new systems for building electrification and new green infrastructure projects, such as Measure M and W. New building codes, tax incentives, and public investment in green infrastructure are pushing a green transformation in the construction industry. The green economy will require construction workers and specialized tradespeople, such as electricians, carpenters, and HVAC technicians, with appropriate training on green building technologies and materials. Infrastructure investments from transit will require worker training for subways and light rail, install and the installation of electrical infrastructure for rail and buses, as well as for stormwater capture, storage, filtration, and distribution.

Many of the fastest growing jobs requiring a bachelor's degree or more are also green, including environmental engineers, energy scientists, and climate policy experts. These innovators will be critical to creating new products, launching businesses, and reacting to new and unexpected climate threats. In the process, they will create more Green Job opportunities. Degree programs serving these students will be increasingly cross-disciplinary, layering in business management, data science, software programming, policy, and mathematics, and thus will help traditional industries become greener over time.

## INDUSTRY SNAPSHOT

### *EV Manufacturing*

While California is a hub for electric vehicle design and manufacturing, its future as a driver of Green Job growth may largely depend on regional and state commitment to the industry. Despite County manufacturing jobs declining 39 percent between 2000 and 2010, similar to national trends, the region has added hundreds of ZEV manufacturing jobs in recent years with the success of firms such as Proterra and BYD.<sup>28</sup> Support from the public sector has been key. These firms count many local public agencies as customers, including Metro, LADOT, Antelope Valley Transit Authority, and Foothill Transit to name a few.

Occupations related to the assembly, fabrication and distribution of new ZEVs are highly accessible, with most requiring only a high school diploma. With 60 Proterra employees recently joining the United Steelworkers union, these positions also present a path to living wages and quality benefits.<sup>29</sup>

28. Environmental and Energy Study Institute. "Fact Sheet: Energy Storage (2019)." 2019. <https://www.eesi.org/papers/view/energy-storage-2019>.

29. St. John, Jeff. "US Storage Market Rebounds as Outage-Scarred California Promises Big 2020 Growth." Greentech Media. December 3, 2019. [www.greentechmedia.com/articles/read/us-storage-market-rebounds-in-q3-as-calif-power-outages-loom-large](http://www.greentechmedia.com/articles/read/us-storage-market-rebounds-in-q3-as-calif-power-outages-loom-large).



# RECOMMENDATIONS

With high opportunities for growth, Los Angeles County has the potential to create a new model for a greener, more equitable economy. Policymakers must recognize the value of the current green economy and lean into opportunities to accelerate Green Job growth and improve workforce development infrastructure. LACI commits to working with regional stakeholders and other partners to achieve our goal of creating 600,000 green jobs countywide by 2050--an ambitious yet achievable goal--by working together to implement the following strategies and recommendations.

# ACCELERATE ECONOMIC RECOVERY | 1

## Drive Green Job Creation Through Public Investment

The public sector can play a pivotal role in signaling market strength and increasing demand in green industries. With local infrastructure investments like those approved by voters, Los Angeles County is already on a path to lead the nation in zero emissions public transportation (e.g., Measure M and Measure R) and clean water future (e.g., Measure W). However, Governor Newsom and President Biden have each set forth bold economic recovery plans through green infrastructure, including clean energy, transportation electrification, modernization of the electric grid, and active transit. For example, distributed renewable energy and storage systems, or microgrids, can create jobs and enhance community resilience.

As the Governor, the California State Legislature, President Biden, and the U.S. Congress consider their proposed state and federal recovery initiatives, green workforce training initiatives should be paired with recovery spending. Training initiatives associated with public sector investments (e.g., WIN-LA and HireLAX), build technical skills in sectors with low barriers to entry, including construction and transportation. Additionally, the Los Angeles County Economic Resiliency Task Force proposed to “formulate policy considerations to propel small business growth and create jobs”<sup>30</sup> to reinvest in communities through local hiring requirements and create long-term job growth opportunities for workers exposed to the green economy.

## RECOMMENDATIONS

- Supporting President Biden’s proposed \$2 trillion infrastructure stimulus package and ensuring LACI’s Transportation Electrification Partnership’s (TEP) \$150 billion stimulus proposal (pp. 54-55) is included by urging Congress to make unprecedented investments in the nation’s transportation infrastructure in direct response to the economic and health crisis caused by the COVID-19 pandemic. The comprehensive proposal—which has earned the support of over 75 businesses and organizations in 15 states—calls for zero emissions vehicle manufacturing and innovation, infrastructure deployment, public and active transit, job training, high-quality workforce standards, and support for related startups and small business, prioritizing those started by underrepresented founders. This proposal would create an estimated 2.3 million jobs across the U.S. with 370,000 in California.

30. “Los Angeles County Economic Resiliency Task Force: Experts and Leaders United to Achieve Economic Recovery”. Accessed December 28, 2020. <https://covid19.lacounty.gov/economic-resiliency-task-force/>



## Zero Emissions Mobility Pilot Project Fund

In May 2019, LACI announced the Zero Emissions Mobility and Community Pilot Project Fund to fund proposed solutions—along with technical assistance from LACI and TEP partners—in disadvantaged communities in the City and County of Los Angeles. The Zero Emissions Mobility and Community Pilot Project Fund selected locales that need zero emission mobility solutions and reduced air pollution and co-benefits such as workforce and economic development. LACI has since worked with community and technology partners to launch in Long Beach (e-micromobility with startup URB-E), Pacoima (e-car share with LACI startup Envoy), and San Pedro (e-car share with LACI startup Envoy). More recently, in Q4 2020 LACI startup Circuit integrated their tech in a zero-emissions community pilot program in Leimert Park alongside e-bike sharing vendor Zoomo. Zoomo’s e-bike rental program for couriers and commuters is partnering with local Ride On! Bike Shop / Co-op to host the rental service. Circuit makes transportation easier, greener and more enjoyable by building on-demand, last-mile shuttle services for cities around the US. Using an on-demand app, fleets of electric cars, and teams of W2 drivers, they’ve provided over 3.5 million rides without charging a dollar or burning an ounce of gas. In Leimert Park, Circuit’s two Neighborhood Electric Vehicle shuttles operate within a set coverage area for on demand service from Thursday through Sunday.

These pilots provide immediate benefits to the local community with reduced air pollution, GHG emissions, noise, and congestion as well as improved safety. Additionally, they will provide economic opportunity to small businesses and individuals through access to zone benefit, workforce development through local hires and cleantech job training, and help create an important mode shift for goods and people movement in Los Angeles.

- Supporting the Governor’s proposed economic recovery package, in particular the \$1.5 billion proposed for infrastructure and incentives to implement the state’s bold zero emission vehicle goals to create jobs, advance equity, and electrify goods movement. This funding is critical to supporting proven incentives and programs that are driving public, private, and individual demand to scale the adoption of zero emissions vehicles and infrastructure, growing our economy.
- Creating the California Electric Vehicle Authority (CEVA) to accelerate transportation electrification, through enhancing coordination, financing, and related workforce and economic development. In addition, the CEVA could help to secure the state’s recovery through the equitable deployment of EV programs in the coming years, and make California a world leader in EV deployment, design, development, manufacturing, supply chain (e.g., lithium), and EV charging infrastructure installation and maintenance. This sector represents an economy-wide transformational opportunity with job training needed for all of the aforementioned sub-sectors.
- Using the power of the public purse at the local, state, and federal level to use purchasing to bolster economic growth and green job creation (e.g., President Biden’s historic executive orders on January 27 to require every level of federal government to advance climate action and environmental justice, purchase EVs and zero-carbon electricity, accelerate clean energy projects, etc.), including through EV procurement, charging infrastructure, building electrification, modernization of the electric grid, water and recycling infrastructure, and zero emissions public and active transit.



# Transportation Electrification Partnership (TEP) Federal Stimulus Plan



## Creates 2.3 Million Jobs Nationally

Research from HR&A found the TEP's \$150 billion federal stimulus proposal "Keeping America Working, Protecting Public Health, and Strengthening our Communities" will create up to 2.3 million jobs nationally in high-road industries with low barriers to entry.



## 15.3 Million Jobs Every \$1 Million Investment

This equates to 15.3 jobs per every \$1.0 million of investment. As a leader in Green Jobs, California can expect an outsized portion of these new jobs. Though California has 12 percent of the nation's jobs, it can anticipate up to 370,000 jobs from the proposal, or 16 percent.



## Accelerate Zero Vehicle Emissions Adoption

Funds from the proposal will help accelerate the Los Angeles region's existing dominance in zero emission vehicle adoption. Specifically, the proposal includes \$25B for zero emission vehicle manufacturing and adoption, \$85B towards zero emissions infrastructure investment, \$25B for zero emissions public and active transit, \$12.5B towards investment in workforce development and job training, and \$2.5B of direct support for innovation and cleantech startups and small businesses.



## Prioritizes Diversity

Startup and small business funds will prioritize firms owned or led by women and people of color, who are less likely to receive venture capital funding.

The Transportation Electrification Partnership has proposed a \$150B federal stimulus plan to advance a more just and resilient economic recovery. The Transportation Electrification Partnership (TEP), convened by LACI, is an unprecedented multi-year partnership among local, regional, and state stakeholders to accelerate transportation electrification and zero emissions goods movement in the Greater Los Angeles region in advance of the 2028 Olympic and Paralympic Games.

# BOLSTER THE WORKFORCE PIPELINE | 2

## Align Green Jobs Knowledge and Workforce Training Resources

The COVID-19 pandemic disproportionately led to job loss in green industries. As these industries recover, it will be difficult to quickly return to pre-pandemic employment levels, thus heightening the need for quality workforce training. The quality of training can be elevated by aligning stakeholders and better connecting workers to job opportunities. Organizations, including LACI, can influence curriculum design and facilitate partnerships between policymakers, industry leaders, and program administrators.

### RECOMMENDATIONS

- Creating a regional consortium to advance Green Jobs. Similar to the model of LACI's Transportation Electrification Partnership, this public-private entity would be tasked with convening key stakeholders to achieve the ambitious yet achievable goal of creating 600,000 Green Jobs by 2050. The focus could be on curriculum alignment, job placements, and identifying enabling infrastructure holding the green economy back. This consortium would align well with the implementation of regional planning for California's workforce development system, leveraging the leadership of the County's seven Local Workforce Development Boards. Key stakeholders include Los Angeles Department of Water and Power, Investor- Owned Utilities (IOUs), Workforce Development Boards, academic leaders, non-profit coalitions, and private industry representatives.
- Ensuring local, state, and federal funding criteria reinforce and support workforce training programs to be updated to better prepare individuals with green jobs knowledge and resources for growing sectors.



### LACI PARTNER KIGT

KIGT is a manufacturer and software developer for smart EV charging. Paul Francis founded the company in 2010, and since then, has continued expanding the company's reach throughout Southern California. In addition to public and private installation, KIGT supports innovative workforce development models through strategic partnerships with community colleges and organizations like LACI.

- Creating a Green Jobs online portal to include not only job postings, but information on green career ladders, sustainability-related workforce programs, Los Angeles County's green industries, and progress. This could be managed by either a nonprofit or a countywide entity within the Los Angeles County Chief Executive Office, such as the Economic Development Division (EDD) or Department of Workforce Development, Aging and Community Services (WDACS).

## Build Capacity to Create More Responsive Regional Workforce Training

In the wake of the COVID-19 pandemic, constrained financial resources will create challenges to scaling up the workforce pipeline to meet the needs of the new green economy. We must respond creatively. Community colleges and workforce training centers with traditional classrooms and workshop space can easily be retooled from traditional industry training to green industry training, and in particular, programs with existing traditional auto mechanic and electrician training degree and certificate programs. Additionally, apprenticeships and paid internships will be essential to bridge the transition back to pre-pandemic employment levels and can support the transition of traditional workers into green industries. To meet this demand for green workforce training we must address persistent issues, including inconsistent funding streams and limited hands-on learning spaces for green skills in Los Angeles County.

- Advocating for recovery funds to be directed towards workforce development program administrators with effectively “shovel ready” facilities, including existing workforce training centers throughout the County, to be appropriately outfitted to support green job training. Key investments include staff training, job placement liaisons, and up-to-date technology in cleantech fields.
- Enhancing and increasing funding for programs designed to recruit and support populations who face additional barriers by providing more soft skill and professional development training than traditional career technical education courses currently do. Community colleges that teach technical skills, but do not have the capacity to teach professional development skills should work with non-profit organizations to develop soft-skill training modules to increase job placement rates.
- Developing industry-led technical support to create more responsive training aligned with job market needs (e.g., emerging EV charging sector), expedite curriculum development, and increase job placement rates. A regional consortium could create a subcommittee focused on relationships between community colleges and industry professionals, which would augment the capacity of the workforce development boards.
- Investing in shared workforce training facilities, or collaborations with lab space and business incubators, such as LACI, to help keep smaller workforce training programs up to speed with newer technologies.



# ADVANCE EQUITY AND INCLUSION | 3

## Increase Underrepresented Populations in Green Industries

We can increase underrepresented populations in green industries and support workforce training designed for underrepresented populations through recommendations to the state and regional workforce investment boards, and other related organizations. The strength of our economic future will hinge on increasing women and people of color in the workforce. Strategic policy interventions, including both carrots and sticks, are necessary to equitably expand the green economy, and help the Los Angeles region lead the way in helping the green economy outperform the overall economy in terms of representation.

### RECOMMENDATIONS

- Creating grants and seed funding for minority and women-owned startups and small businesses, as they are least likely to receive traditional venture capital funding. This could be developed as a new funding source or created as a criterion for existing and proposed programs, including the California Climate Catalyst Fund, a proposed low-interest revolving loan fund targeted to green small businesses who might not qualify for venture capital funds. The \$150 billion federal transportation electrification stimulus proposed by the Los Angeles Transportation Electrification Partnership includes prioritization for businesses and startups owned by women and people of color.
- Promoting diversity/equity training and education modules for green industry leaders, as a first step to address discriminatory stereotyping in green industries, particularly against workers with barriers to entry. These modules should be delivered in partnership with community-based organizations advocating for people historically excluded from the workforce, thus better addressing on-the-ground challenges and creating more inclusive pathways to hiring.



#### LACI STARTUP ChargerHelp!

ChargerHelp! is a Los Angeles based startup that enables a community's local workforce to easily validate, troubleshoot, or escalate a software or communication issue of a networked EV charger. Founded by a female founder from South Central Los Angeles, ChargerHelp! is tackling a major pain point in electric vehicle (EV) charging infrastructure – repair and maintenance. At the same time, the company is committed to workforce development and economic mobility. ChargerHelp! is creating an entirely new career role – part technician, part electrician, part IT support. And the company wants to prioritize training those local to the community. A member of LACI's Incubation Cohort 1 program, ChargerHelp! has already made its mark by winning the first-ever Digital Workforce Challenge from MIT Solve.

- Advocating for public and philanthropic funding for diversity hiring initiatives within the private and public sectors to increase minority representation in existing cleantech businesses. This should be directed to increase diversity at every organizational level, including diversity hiring initiatives at the board or leadership level, where people of color are largely underrepresented due to barriers to higher education access. In addition to hiring initiatives, private and public sectors should set targets to allocate contracts for green businesses owned by women and people of color.
- Requiring project labor agreements and community benefit agreements for green infrastructure projects wherever possible to leverage public dollars and incorporate inclusive hiring practices. This should accompany a procurement policy to encourage businesses to purchase from and support green businesses with equitable hiring practices in place.

## Support Workforce Training Designed for Underrepresented Populations

Within the larger training landscape, workforce programs central to diversity and inclusion in green industries should conduct sustained outreach and incorporate soft skill training and wraparound services into curriculum development. More resources are necessary to support equitable workforce training outcomes.

### RECOMMENDATIONS

- Funding workforce development programming which prepares underrepresented communities for high-road job opportunities via targeted outreach programs, paid internships and apprenticeships, and grants and scholarships. The Breaking Barriers to Employment Initiative, led by the California Workforce Development Board, should be used as a model for grants that supplement existing workforce development programs while providing wraparound services, including adult education and on-the-job training.
- Incorporating soft skill training and wraparound resources in green workforce development programs. Many stakeholders emphasized that green programs must go beyond technical training to be successful. Green workforce training programs should target soft skill development to better serve populations with barriers, such as adult and displaced workers, youth populations, and populations with additional barriers, including women, veterans, individuals with prior convictions, people experiencing homelessness, or residents in disadvantaged communities (among others). In addition, these populations frequently require wraparound resources, including childcare, transportation access, broadband access, and others. Soft skill training focuses on professional development and job readiness, and when delivered with wraparound services, helps equalize access to Green Jobs for underserved communities and workers with diverse backgrounds.
- Increasing sustained outreach and data tracking in green training. Outreach is critical to bring awareness of green opportunities to underserved communities, especially given that many green opportunities are new and unfamiliar. Additional outreach and advocacy should be designed to address recruiting and hiring bias among companies that have not yet hired from disadvantaged communities. Beyond outreach campaigns, program administrators highlighted the importance of tracking program performance metrics. However, with resources already stretched thin, many administrators cannot afford to or do not have the tools to track students afterwards to track program success and growth opportunities.

<sup>31</sup> Prasad, Melanie Jamilleh, et al. "Labor and Community Groups Sign Landmark Community Benefits Agreement with Proterra" <https://www.proterra.com/press-release/labor-and-community-groups-sign-landmark-community-benefits-agreement-with-proterra/>



### Proterra

Proterra is a leading innovator in heavy duty electric transportation. headquartered in Burlingame, CA. In October 2020, Proterra along with the Los Angeles County Department of Workforce Development, Aging, and Community Services (WDACS), United Steelworkers (USW) Local 675, Jobs to Move America (JMA), and Citrus College launched a first-of-its-kind Electric Bus Manufacturing technology training program, which was developed to advance diversity, equity, inclusion, and job quality in the green manufacturing sector by targeting historically underrepresented groups with barriers to employment. On the heels of this collaboration, Proterra, Jobs to Move America, and the United Steelworkers (Local 675) formed a Community Benefits Agreement in Los Angeles County. Under the agreement, Proterra committed to a goal of 50 percent of new hires to be from communities facing significant barriers to employment, including people of color, veterans, and returning citizens.

The Community Benefits Agreement (CBA) will lead to transformative investments in Los Angeles communities to train, support, and hire workers for skilled union jobs in zero emissions bus manufacturing at Proterra's City of Industry facility and allow for the creation of worker-led groups, such as the Latinx Group and Veterans Groups. JMA, USW 675, and Proterra will be able to jointly review feedback from the groups to identify resources for ongoing worker-identified needs; develop a pre-hire training and apprenticeship program; expand Proterra's Spanish-English language capacity beginning with the translation of key documents; and allow JMA coalition partners to provide ongoing support services such as case management, for workers with employee approval.<sup>31</sup>

# CLEARLY DEFINE GREEN JOBS AND TRACK METRICS

# 4

## Improve Evaluation of Green Industry Performance Metrics

Currently, growth in green fields is tracked at the industry level. In reality, the green economy cuts across industries and includes a wide range of occupations, ranging from manufacturing and production to administrative support. Without a clear definition of Green Jobs, standard industry tracking metrics cannot encompass the full green economy. Better metrics will allow policymakers and workforce training administrators to better understand the evolving green economy, the areas in need of workforce training investment, and measure the success of increased diversity and equity efforts.

### RECOMMENDATIONS

- Urging the Biden Administration and Congress to renew funding to update the Bureau of Labor Statistics (BLS) industry and occupational green jobs definitions and the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) codes to better align with current and emerging cleantech industries. Ensure there is a crosswalk between initial and updated classifications. This updated definition of “Green Jobs” should be developed in partnership with the State of California to increase transparency between academic, public sector, and private sector understanding of the term.
- Urging the Biden Administration and Congress to renew funding for updating the national quantitative measurement of Green Jobs (i.e., Green Goods and Services (“GGS”) Occupations study--based on 2011 data-- released by the Bureau of Labor Statistics in 2013), to track the pace of the greening of the economy nationally and regionally. This will require extensive surveying of businesses on industry sales and practices, following a similar approach as the BLS 2013 Green Goods Services (GGS) study (based on 2011 data), to determine the percentage of each industry and occupation that can be considered “green.”<sup>32</sup>

<sup>32</sup> For more information on BLS GGS survey methodology, see the technical note here: [https://www.bls.gov/ggs/ggs\\_technote\\_extended.pdf](https://www.bls.gov/ggs/ggs_technote_extended.pdf)



- Conducting a new and California-specific Green Goods and Services (“GGS”) survey by a statewide entity (e.g. California’s Employment Development Department or Labor & Workforce Development Agency) to gather information on regional and statewide industry strengths. In addition to typical industry performance metrics, data should be collected on worker wages, benefits, and training requirements, as well as sociodemographic characteristics, including gender and race. This data has a wide range of possible uses: for instance, it could enhance a municipality’s ability to support local green industries, support Investor Owned Utilities in reaching their supplier diversity goals (GO 156), and help industry leaders identify target areas for workforce investment. The State of California could spearhead this effort absent a rapid change in federal approach to measuring the green economy.



# CONCLUSION

Local, state, and federal action must be taken to support the growth of green industries. Growth opportunities in the green economy and concerns about contracting investment make green industries prime candidates for state and federal stimulus funding. This will create immediate high-road jobs with social co-benefits including greenhouse gas reductions and community health.

These investments can set the stage for the longer transition to a green economy. To meet the greenhouse gas emission targets set by the City, County, and State, unprecedented investment must be made in the energy, transportation, and the built environment sectors. With the potential to add up to 600,000 Green Jobs by 2050, matching investments must be made in quality workforce training. Together, these investments have the potential to get Los Angeles back on track to a greener, more equitable economy.

