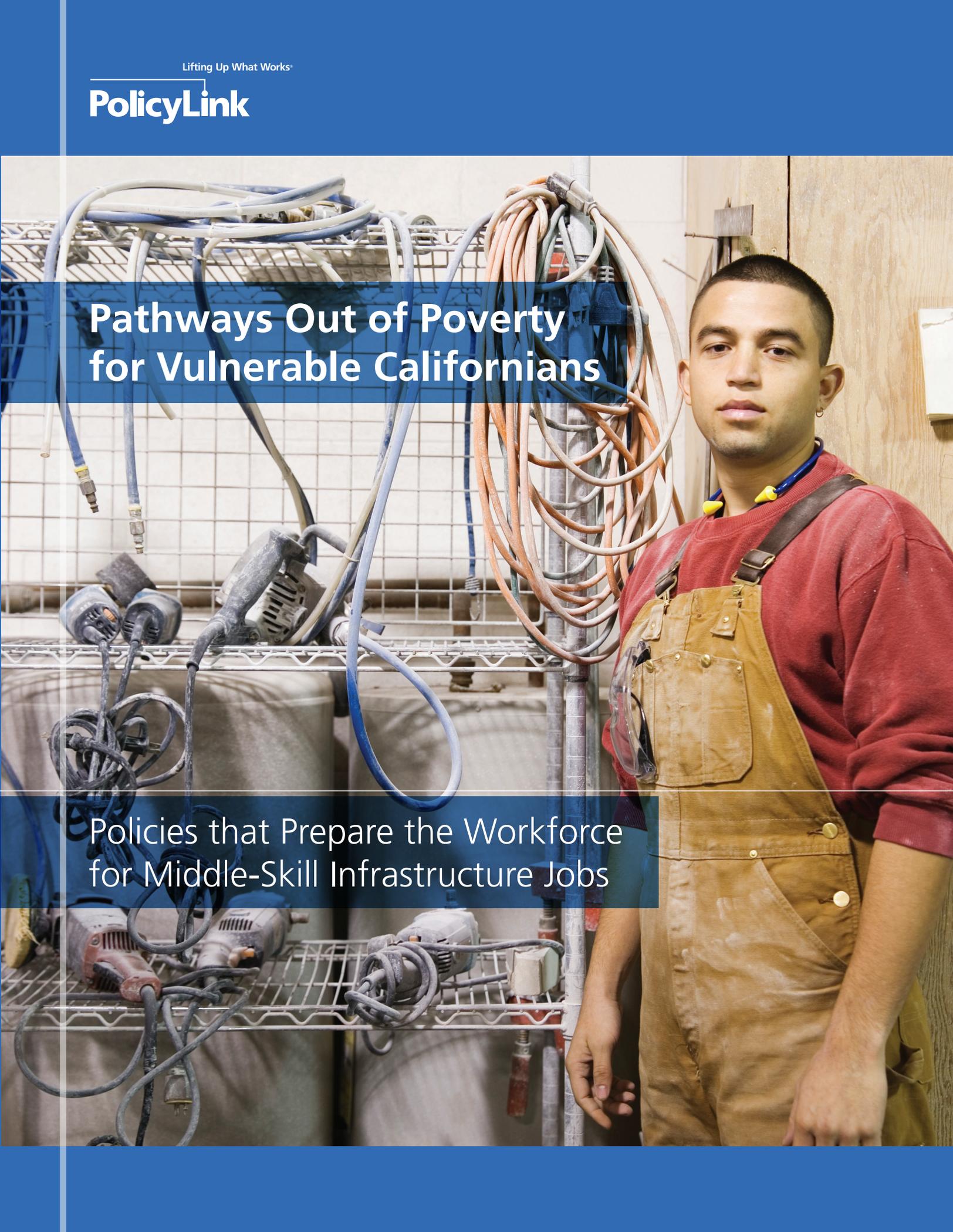


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A young man with short dark hair, wearing a red long-sleeved shirt and brown work overalls, stands in a workshop. He is looking directly at the camera with a neutral expression. Behind him is a metal shelving unit filled with various tools and equipment. On the top shelf, there are several bundles of cables in blue, orange, and white. Below that, there are power tools like a drill and a sander. The background shows a wooden wall and a white tiled wall.

# Pathways Out of Poverty for Vulnerable Californians

Policies that Prepare the Workforce  
for Middle-Skill Infrastructure Jobs

*PolicyLink is a national research and action institute  
advancing economic and social equity  
by Lifting Up What Works®.*

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# Pathways Out of Poverty for Vulnerable Californians

Policies that Prepare the Workforce  
for Middle-Skill Infrastructure Jobs

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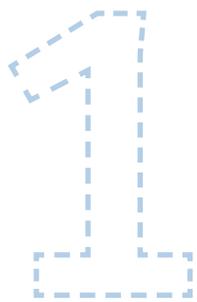
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# Table of Contents

<b>5</b>	<b>Executive Summary</b>
<b>7</b>	<b>Introduction</b>
<b>9</b>	<b>A State in Educational Crisis: New Prospects for Improving Postsecondary Success among Vulnerable Young Californians</b>
<b>13</b>	<b>Middle-Skill Job Opportunities in California’s Infrastructure Sector</b>
16	Logistics Sector
16	Construction Sector—Transportation Facilities and Buildings
18	Utilities Sector
19	Green Energy Sector
20	Water and Wastewater Sector
<b>23</b>	<b>California Community College Workforce-Training Programs: New Career Pathways to Middle-Skill Infrastructure Jobs</b>
24	Training for Middle-Skill Infrastructure Jobs: Case Studies
26	PG&E PowerPathway Program
28	Silicon Valley Solar Industry-Driven Regional Collaborative
30	Project: WaterWorks, Cuyamaca College Water Technology Program
<b>33</b>	<b>Policy and Systemic Reform Agenda to Strengthen Community Colleges</b>
33	Barriers to Student Success
34	Barriers to Program Success
<b>37</b>	<b>System- and State-Level Challenges and Policy Recommendations</b>
<b>43</b>	<b>Notes</b>





## Executive Summary

Infrastructure, so long relegated to the background in the worlds of economic policy, urban revitalization, and workforce development, has recently become the center of much more attention. Due to the federal economic stimulus, the growing interest in the green economy, and crises caused by underinvestment in public works, infrastructure has enjoyed a much higher profile of late. Jobs in infrastructure are growing in number and changing in the skills that they require as California strives to develop a more sustainable pattern for development. Energy production and conservation, water, transportation, communications, and other massive systems need to be redesigned, rebuilt, and maintained, and that work will require hundreds of billions of dollars in new investment, constituting a large part of the state's economy.

Because many of its entry-level positions can be attained with little education, the infrastructure sector is remarkably well suited to moving large numbers of Californians onto career pathways—routes along which they can attain good pay and benefits and get solid returns on their investment in training and education. This is good news for young Californians who are navigating the state's competitive labor market with less than a high-school diploma and for incumbent workers in related sectors who have been laid off due to the severe economic downturn.

However, getting in the door is not the same as being able to get ahead. Career pathways to good, middle-skill jobs in the infrastructure fields are only open to those who can attain new skills, knowledge, and the related credentials. Community colleges, the state's largest provider of workforce education and training, can only realize their potential if they are equipped to handle both the technological changes in these industries and the needs of their diverse students. Community colleges are one of the state's key vehicles for economic mobility and social equity, if and when they can deliver on their promise.

This report examines California's infrastructure sector and its community colleges to learn what is being done at this time and what will be needed. Through analysis of the labor market, assessment of innovative programs, and consultation with a diverse cross-section of education and labor leaders, we confirmed four key trends.

### **There is a growing unmet demand for community college-trained and/or state-certified workers in the infrastructure sector.**

The five infrastructure subsectors we examined will annually generate more than 36,000 new jobs in the state that require less than a bachelor's degree. With "baby boomers" preparing to retire over the next decade, the number of job openings in infrastructure is projected to grow at a faster clip than overall population growth. For example, over the next decade, the California electric utilities sector alone is projected to have between 44,000 and 87,400 openings, 85 percent of which will be available to workers with less than a bachelor's degree.

Emerging infrastructure industries are also growing in employment, but will be less predictable in the short-term. The new interest and investment in the "green economy" is creating rapid growth in different jobs with a wide range of educational and technical entry requirements. Changes in technology and a new focus on ecological sustainability are fundamentally transforming the field of infrastructure—creating new subsectors, refashioning old ones, and bringing typically marginal sectors into the forefront. Many entry-level infrastructure jobs are now "middle-skill." Areas based on the diffusion of new technology, such as solar energy, or on new government spending commitments, such as home weatherization and energy retrofitting, are very promising for the long term even as they face wide swings in the availability of tax credits, capital, and orders for business in the short-term, whether as part of the recovery effort or in the private market.

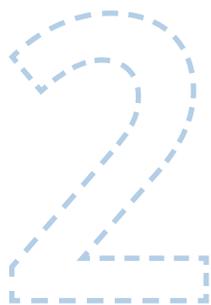
**While small in scale, community colleges have developed training programs that are successfully preparing students for work in infrastructure fields.** Where they are in place, programs in energy utilities, water systems, solar power installation, diesel engine retrofitting, construction skills, and other aspects of infrastructure have succeeded in job training and placement across the state. The programs profiled in this report focus on more diverse recruitment, and have, to varying degrees, targeted underemployed and low-income youth and adults. Their total enrollment is very small, but they provide a blueprint for expanding educational efforts. Entrepreneurs and community-based organizations have also recently responded to the need for additional workers in many creative ways, often in partnership with community colleges.

**Policy reforms at the district, state, and national level are necessary to bring these “boutique” training programs to scale.** Advocacy and collaboration are necessary to expand the three principal career pathways to middle-skill infrastructure jobs in California—career tech high schools, apprenticeship programs, and community colleges. Although the California community college system is well positioned to play a leadership role, local colleges and districts face tremendous challenges sustaining and scaling up infrastructure-related workforce programs. Training for jobs in the infrastructure industries requires specialized curriculum and up-to-date equipment that incurs costs far greater than merely buying a textbook and paying a faculty member’s salary. Similarly, building effective partnerships between industry and community groups can give students the edge they need in the labor market, but it is time consuming and expensive, as is providing basic skills and support services to students with significant gaps in academic preparation and greater financial

need. Meanwhile, the state budget cut sustained by community colleges in (\$235.6 million) in 2009–2010 and on-going problems with the financing of student supports pose serious threats to the capacity of local colleges to continue offering the career ladder-oriented workforce programs we highlight in this report. Advocates for these innovative workforce-training programs will have to push for adequate funding at the program and system levels.

**Public education and advocacy is needed to ensure that the principles of inclusion and equity guide the allocation of infrastructure and of training resources.** Historically, decisions about which communities receive essential transportation, school construction, utilities, access to broadband, water, and parks have not favored disadvantaged communities. Equally important, large public investments have not come with stipulations to create access to jobs for youth and adults who have higher rates of disadvantage and unemployment. As a result, many of the community and public-sector leaders interviewed for this report expressed concerns that low-income workers will be squeezed out as better-educated and recently unemployed middle-class workers step in to fill the demand for trained workers in the infrastructure arena, including the new green sector.

To ensure that this does not occur, community leaders, educators, public officials, and some business leaders are advocating for policy mandates that include: (1) using hiring agreements and numerical targets to set aside a percentage of jobs created by large scale, publicly funded infrastructure projects for residents of disadvantaged communities and (2) making complementary investments in workforce-training programs to prepare disadvantaged youth and adults for those jobs.



## Introduction

Until recently, public investment in infrastructure was not consistently the subject of widespread media attention and public debate. This was true even in California, where voters have repeatedly passed ballot initiatives authorizing billions of dollars of general obligation bonds to build new schools, transportation projects, flood and water systems, parks, and other basic infrastructure. State bond issues totaled \$46 billion in 2006 alone. The Obama administration's decision to make infrastructure building and related "clean energy" investments (which include mass transit, electrical grid modernization, and other utilities and public works) a centerpiece of the economic recovery strategy in the American Recovery and Reinvestment Act (ARRA) dramatically raised public awareness of this important economic sector. As of the end of 2009, 52,000 jobs had been created or retained directly in the clean energy sector as a result of ARRA spending, and the Council of Economic Advisors projected that through 2012, there would be 719,600 job-years resulting from ARRA clean energy investments.<sup>1</sup>

With unemployment approaching double digits nationally and higher than the national average in California, infrastructure, in particular the emerging green industries, is central to the national conversation on how to create jobs and bolster business activity.

Initiated before the passage of ARRA, the following study examines whether the infrastructure sector can help California's undereducated young adults access

jobs that pay well, many of which offer significant career ladder opportunities, and if so, how to do so.

There is a growing and unmet industry demand for workers who are community college trained and/or certified to work in specific occupations. Overall, in the five infrastructure subsectors we examined, there were 773,611 "middle-skill" jobs,<sup>2</sup> high-paying positions that require less than a bachelor degree, in the industry (see table 5). For a sense of scale, that is nearly enough positions to put to work the roughly one million 18- to 24-year-old Californians without high-school diplomas.

Seeing the prize however, is not the same as claiming it. The following report includes findings and recommendations for systems change, derived from the experiences of those hard at work on it. During the course of our research we interviewed current workforce and education practitioners and examined eight innovative community college programs, three of which are profiled in this report. Three convenings of leaders in education, youth development, and labor were held in Oakland, San Jose, and Fresno to explore program and policy challenges at an intensive level. We reviewed state and federal labor market data focused on the long-term viability of the infrastructure sector, as well as more recent studies on the green economy. We also drew on our experience in local, state, and national advocacy to strengthen access to effective workforce training for disadvantaged youth and adults through the ARRA and in other settings.

“ Our nation is in the midst of a perfect storm—the result of the confluence of three powerful forces—that is having a considerable impact on our country. If we maintain our present policies, it is very likely that we will continue to grow apart, with greater inequity in wages and wealth, and increasing social and political polarization. If, however, we recognize the power of these forces as they interact over the years—and we change course accordingly—then we have an opportunity to reclaim the American dream in which each of us has a fair chance at sharing in any future prosperity.

**What are the three forces comprising this perfect storm? They are divergent skill distributions, the changing economy and demographic trends.”**

—*America’s Perfect Storm:  
Three Forces Changing Our Nation’s Future,*  
2007 Educational Testing Service policy report<sup>3</sup>





## A State in Educational Crisis: New Prospects for Improving Postsecondary Success among Vulnerable Young Californians

Long before Educational Testing Service issued this warning, educators, community and business leaders, and public officials in California had reached a consensus that persistent education gaps were keeping students from low-income communities and communities of color from reaching their potential and that this put the economic and social well-being of the state in serious jeopardy. A plethora of studies in the 1990's focused on this urgent state challenge. More recently, in its 2009 report, *Educating California: Choices for the Future*, the Public Policy Institute of California (PPIC) noted that the state will need to increase the number of bachelor's degrees awarded annually by 60,000 to close the projected gap between the current number of yearly college graduates and those that will be needed by 2025.<sup>4</sup> Researchers offered a short menu of broad policy and system solutions. Among them: increase the college attendance rates of high-school graduates, make modest increases in community college transfers to four-year colleges, and improve retention and graduation rates among students who are already enrolled in four-year colleges and universities.

Equity-oriented researchers and advocates who take a systems-change approach have called for reform of policies and institutional practices that contribute to high drop-out rates and poor college enrollment rates for low-income students and students of color. Equity advocates have recently won local and state policy legislative battles to ensure that schools in low-income communities and communities of color hire experienced teachers, provide an expanded array of after-school and community supports, and provide all students with access to a rigorous "A-G curriculum," based on the eligibility requirements for admission to the California State University (CSU) and University of California (UC) systems.

Coalitions led by manufacturing industries and labor have released reports questioning the decision of several large urban school districts (e.g., Los Angeles, San Jose, Oakland) to make the A-G curriculum the default curriculum for all high-school students in their districts. Arguing that a stronger focus on career technical education is needed in order to prepare students for good paying jobs, these coalitions have sponsored legislation that would put career technical education on equal footing with the A-G curriculum. Both groups of advocates have focused attention on low-income students, students of color, and immigrants (who are the majority of students in the public K–12 and community colleges and will make up the majority of future taxpayers) as central to this policy debate.

As a result of the economic downturn that began in 2007, high-school graduates are now more than twice as likely as college graduates to be jobless. One out of every five high-school dropouts is unemployed.<sup>5</sup> The PPIC study also notes that college graduates earn almost twice as much per hour as high-school graduates and, as a result of the growing wage gap between the highly educated and the undereducated, "income inequality has also reached record levels and is greater in California than in the rest of the nation."<sup>6</sup> Another recent report by the president's Council of Economic Advisors called for concerted action to significantly increase the number of Americans who earn vocational certificates and associate degrees in the next decade.<sup>7</sup>

Against this landscape, we analyzed educational attainment data for the state and five metropolitan regions. The evidence reinforces the urgency of creating a more integrated educational reform strategy to prepare 18- to 24-year-old Californians to successfully compete for good paying jobs. Two-thirds of young Californians leaving state high

schools each year will need community college or other postsecondary workforce training to successfully navigate an increasingly competitive labor market. At the close of the 2006–2007 academic year, only 126,516 (roughly 32 percent) of 356,641 high-school graduates were UC/CSU eligible. About 58 percent of high-school graduates (230,125 students) did not meet these requirements. In that same year, the adjusted high-school dropout numbers for grades 9–12 indicated that 109,011 students had left high school without a degree. The number of high-school dropouts and those who graduate unprepared to enter California’s four-year colleges and universities each year represent 339,136 young women and men entering the state’s very competitive labor market without the skills to compete (see Table 1).

A comparison of success rates among racial and ethnic groups and regions reveals the need for a multifaceted and equity-based reform strategy. Only 26 percent of the 25,737 African Americans and 25 percent of the 128,462 Latinos who graduated in 2006–2007 were prepared to pursue a four-year college education. Meanwhile, 155,251 high-school-age Latinos either dropped out or graduated high school ineligible for admission to a four-year college or university. In that same school year, a total of 35,028 African American high-school-age students either dropped out or graduated high school ineligible for admission to a four-year college or university. The second largest number (22,691) of high-school dropouts in 2006–2007 was of white high-school-age students, which underscores the fact that this crisis is systemic in nature and not limited to any particular racial group. Performance

**Table 1. Regional and State Student Achievement Data (2006–2007 Academic Year)\***

Region**	Number of Graduates	Graduates Meeting UC/CSU Entrance Requirements	Graduates Not Meeting UC/CSU Entrance Requirements	Adjusted Grade 9–12 Dropout Total***
Bay Area	32,870	14,893	17,977	7,918
Central Valley	24,704	6,974	17,730	8,860
Inland Empire	44,733	11,937	32,796	15,974
Los Angeles	87,119	35,080	52,039	32,986
San Diego	29,572	11,791	17,781	8,594
<b>TOTAL, SELECTED REGIONS</b>	<b>218,998</b>	<b>80,675</b>	<b>138,323</b>	<b>74,332</b>
<b>BALANCE OF STATE</b>	<b>137,643</b>	<b>45,841</b>	<b>91,802</b>	<b>34,679</b>
<b>STATE TOTALS</b>	<b>356,641</b>	<b>126,516</b>	<b>230,125</b>	<b>109,011</b>

\* California Department of Education, DataQuest, tables of numbers of graduates and dropouts by county, 2006–2007, <http://dq.cde.ca.gov/dataquest/> (accessed May 11, 2009).

\*\* For the purposes of this data set, the Bay Area is defined as Alameda County, Contra Costa County, San Francisco County, and San Mateo County; Central Valley is defined as Fresno County, Kern County, Madera County, and Tulare County; Inland Empire is defined as Riverside County and San Bernardino County; Los Angeles is defined as Los Angeles County; and San Diego as San Diego County.

\*\*\* Total reported dropouts adjusted by removing reenrolled dropouts and adding lost transfers.

numbers for the Bay Area, Central Valley, Inland Empire, Los Angeles, and San Diego regions similar patterns and highlight the need to tackle this urgent concern at both state and regional levels.

The systems-change and policy reforms undertaken by equity-minded educators, with the support of community groups, business, and state policy makers, have improved the numbers of low-income students, immigrants, and students of color graduating prepared for college and careers.

However, the statistics shown here demonstrate that a reform strategy that is focused primarily on the K–12 system and four-year colleges and universities does not address the needs of the majority of young Californians who are leaving high school unprepared for success in either college or the competitive labor market. The state's workforce system, and the critical role of community colleges within it, must be the centerpiece of any statewide system and policy reform to improve postsecondary attainment of the most vulnerable 18- to 24-year-old Californians.

**Table 2. Graduation and Dropout Totals by Ethnicity: State of California 2007\***

	American Indian	Asian	Pacific Islander	Filipino	Hispanic	African American	White	Multiple	TOTAL
Number of Graduates	2,866	38,105	2,385	11,762	128,462	25,737	138,595	8,729	356,641
Graduates Meeting UC/ CSU Entrance Requirements	675	22,804	670	5,376	32,368	6,818	54,715	3,090	126,516
Adjusted Grade 9–12 Dropout Total**	1,265	3,931	840	1,491	59,157	16,109	22,691	3,527	109,011

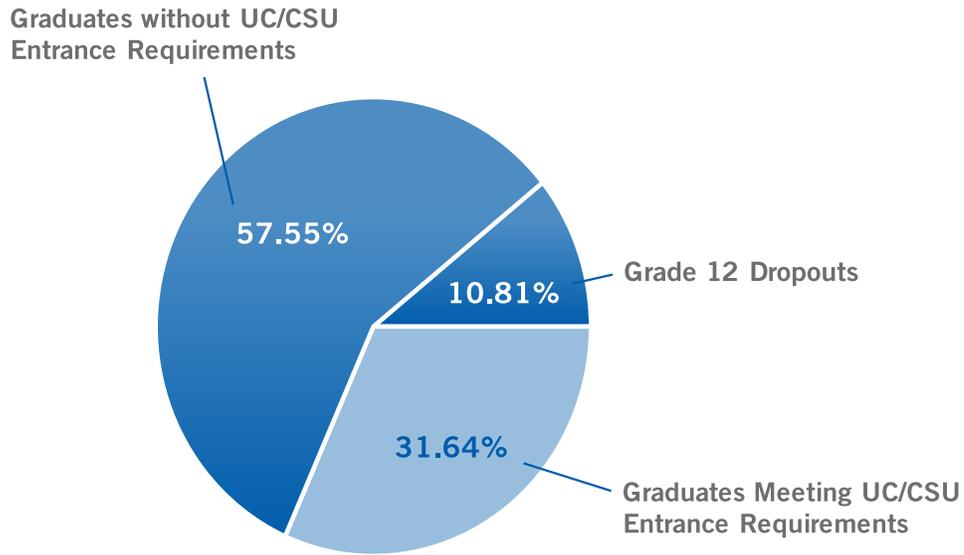
\* California Department of Education, DataQuest, tables for dropouts by ethnic designation and grade and number of graduates by county 2006–2007. <http://dq.cde.ca.gov/dataquest/> (accessed December 12, 2008).

\*\* Total reported dropouts adjusted by removing reenrolled dropouts and adding lost transfers.

### Chart 1. Percentage of High School Seniors Statewide:

Dropouts and Graduates with and without UC/CSU Requirements (2006-2007)

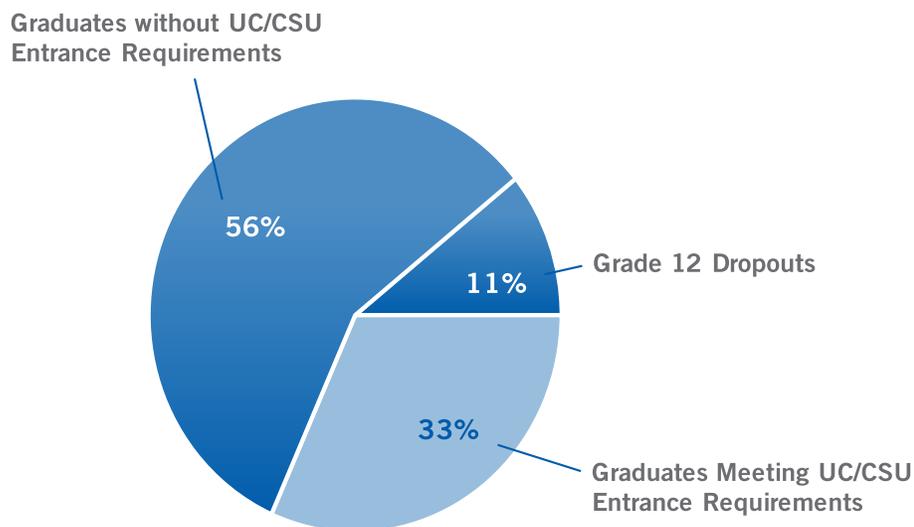
N=399,850

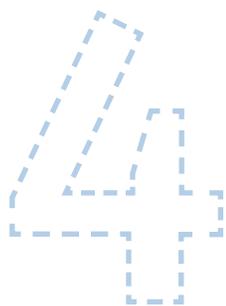


### Chart 2. Percentage of High School Seniors in Case Study Regions:

Dropouts and Graduates with and without UC/CSU Requirements (2006-2007)

N=228,212





## Middle-Skill Job Opportunities in California's Infrastructure Sector

Infrastructure has traditionally been a very appealing source of good jobs and a cornerstone of economic development. There are four main reasons for its appeal: the high multiplier effects of direct spending in this sector (\$1.53 is generated in new spending and investment for every \$1 invested), the fact that infrastructure projects are needed in all regions of the country, the reality that most of the work (with important exceptions such as steel-making) cannot be moved “offshore,” and, of course, the possibility of rapid and abundant job creation.<sup>8</sup>

The familiar image of a new infrastructure worker is of a young, local male just out of high school, getting his start as a laborer or coming up through an apprenticeship in the building trades, construction, or utilities industries. While those pathways still exist, many infrastructure jobs today, both in the trades and outside of them, tend to be more high tech, requiring education beyond high school. If that trend is to work to the advantage of low-income men and women and communities of color, where students have been largely failed by K-12 public education, some very substantial changes will be necessary.

We begin our analysis by examining trends in the nature of jobs and industries. Most basic industry trends are national and apply equally to California, while the state is ahead of the curve in adoption of certain new technologies. Even in this persistent recession, amidst the disappointing employment trends, there are 450,000 job openings nationwide in infrastructure sectors.<sup>9</sup> Changes in technology and a new focus on ecological sustainability are fundamentally transforming the field of infrastructure—creating new subsectors, refashioning old ones, and bringing typically marginal sectors into the forefront. Some of these changes include:

- The gradual shift from fossil fuels to renewables in the energy production of our public utilities
- A mandate for energy efficiency in the design and construction of new buildings
- Replacement of outdated wastewater and storm-water pipelines to capture higher levels of sewage and runoff
- Reordering of regional transportation priorities from the construction primarily of roads and highways to a smarter blend, taking account of the need for mass transit.

The sector analysis that follows provides a more detailed picture of infrastructure employment opportunities, including the nature of the industries and jobs, entry requirements, career ladders, and job-growth projections across the sectors. The infrastructure sectors as defined for this job-oriented analysis include five general occupational categories: water and wastewater; utilities; logistics, trade, and goods movement; transportation construction; and finally, the burgeoning green infrastructure sector, defined here as occupations in renewable energy, energy efficiency, and alternative fuels. The analysis focuses on entry-level, middle-skill jobs and the associated career ladder occupations, up to and including management and supervisory positions. Examining these ranges of occupations helps to situate the numerous middle-skill jobs (42 percent of infrastructure employment, as shown in table 3) within these broader career pathways.

The job projections cited here are mostly based on long-term trends, in which past levels of spending on infrastructure are carried forward into the future, with no major changes due to short-term economic events. With a few exceptions, the figures

do not take into account the recent proposals for massive infrastructure investment from state and federal government, and the changes wrought by the recession and the stimulus are too recent to be picked up by these kinds of data and projections. If many of the major new investments are made, from replacement water systems to new transit

lines to the expansion of airport and freight rail facilities, the numbers of jobs in both construction and operation of infrastructure will be greater than the estimates shown here. Even without accounting for the spending from these stimulus/recovery measures or recent bond issues, there will be ample job growth across infrastructure

**Table 3. California Infrastructure Positions by Skill Level\***

Skill Level	Share of Infrastructure Employment	Average Wage
Higher-Skill	46%	\$73,696
Middle-Skill	42%	\$41,868
Lower-Skill	12%	\$19,082

\* Doug Henton, et al., *California's Golden Opportunity: Building a World-Class Infrastructure through Innovation and Collaboration* (Sacramento: California Economic Strategy Panel, 2007), [www.coecon.com/Reports/ECONOMY/GoldenOpportunity.pdf](http://www.coecon.com/Reports/ECONOMY/GoldenOpportunity.pdf).

**Table 4. Middle-Skill Job Openings and Certifications in California's Infrastructure Sectors<sup>10</sup>**

Sector	Annual Job Openings*	Individuals Attaining Community College Certification/Diploma, 2007–2008**
Construction	15,056	3,131
Green	15,750***	1,620****
Logistics	2,788	2,868
Utilities	2,528	211
Water	413	161

\* California Employment Development Department, *California Occupational Guides*. The job categories are a synthesis of selected middle-skill occupations, defined as those jobs that require more education and training than a high school diploma but less than a four-year degree, paying a living wage, with expected growth in key sectors of the workforce. They are taken from: California Employment Development Department, *Labor Market Information, Occupational Profiles, 2008*, Where occupations are found in more than one of these sectors (such as electricians, who can be found in both construction and utilities) their job openings are distributed in accordance with the proportions working for different types of employers (e.g., general contractors or electrical utilities) as shown in the Guides. [www.labormarketinfo.edd.ca.gov](http://www.labormarketinfo.edd.ca.gov). Note: the jobs projections do not take into account effects from the federal stimulus package. <http://www.labormarketinfo.edd.ca.gov/occguides/> (accessed 2008).

\*\* California Community Colleges Chancellor's Office, 2008.

\*\*\* Next 10 and Collaborative Economics, *California Green Innovation Index 2009*, [www.nextten.org/pdf/GII/Next10\\_GII\\_2009.pdf](http://www.nextten.org/pdf/GII/Next10_GII_2009.pdf).

\*\*\*\* Centers of Excellence, *Research Briefing, 2009: Green Industries & Jobs in California* (San Jose: California Community Colleges Economic and Workforce Development Program, 2009), [www.cwib.ca.gov/library/doc\\_files/Briefing\\_09.pdf](http://www.cwib.ca.gov/library/doc_files/Briefing_09.pdf).

**Table 5. California Infrastructure Sector Jobs: Current Employment and Job Growth\*<sup>11</sup>**

Infrastructure Sector	Current Employment (middle-skill and ladder positions)	Annual Job Openings
Construction (buildings, parks, transportation)	514,109	15,056
Green Jobs (energy efficiency and renewable energy)**	105,000	15,750
Logistics (within trade and transportation)	73,075	2,788
Utilities (telecommunications, power)	69,887	2,528
Water and Wastewater	11,540	413
<b>All Sectors Total</b>	<b>773,611</b>	<b>36,535</b>

\* California Employment Development Department, California Occupational Guides, [www.labormarketinfo.edd.ca.gov/occguides/](http://www.labormarketinfo.edd.ca.gov/occguides/) (accessed 2008.) Same procedure as for Table 4.

\*\* Next 10 and Collaborative Economics, *California Green Innovation Index 2009*, [www.nextten.org/pdf/GII/Next10\\_GII\\_2009.pdf](http://www.nextten.org/pdf/GII/Next10_GII_2009.pdf).

sectors over the long term. Annual average openings in middle-skill positions in the five selected infrastructure sectors total 36,535 jobs (see Table 5) and even if the annual totals dip lower and then higher, there is no reason to think these long-term average estimates are any less accurate.

Many undereducated young women and men can reach the first rung in the middle-skill career ladder in these five infrastructure sectors with their current educational attainment. The fact that a good number of existing career preparation programs can be accessed with less than a high-school diploma makes them ideal on-ramps to these new opportunities. Only a high-school diploma, or GED and vocational training, are required to access at least one entry-level middle-skill job in each of these subsectors. However, to move to the next rung, which requires completion of a one-year certificate, these young Californians will need good infrastructure-related workforce education programs. To succeed there, they will need the basic skills education curriculum and the support service models that have proven most effective in boosting academic success among low-income youth, immigrant youth, and youth of color.

Industry certifications and college credit are the strongest and most widely accepted markers of occupational skill and preparation. Nevertheless, as table 4 shows, in every sector there is a wide gap between jobs available and the number of potential applicants leaving California community colleges with related certificates or associate degrees, indicating a clear opportunity for the state's workforce training system to expand community college pipelines to "good jobs."

The combination of all these trends bodes well for the proposition of using infrastructure employment as a pathway out of poverty. Unlike employment growth in the past thirty years, a jobs boom with infrastructure at the forefront has the potential to create an abundance of "good" jobs accessible to the majority of the population, not just those at the top of the skills hierarchy. But in the likely event that the job projections are correct, the question still remains: who will get them? In other words, how will these prized infrastructure jobs be distributed across communities?

## Logistics Sector

With the trade of commodities growing increasingly complex and far-reaching, and personal travel increasing exponentially in recent decades, the industries responsible for delivering products and people to their destinations have been under pressure to continuously adapt, innovate, and work more efficiently. Progress is largely due to advancements in communication and database technologies, which has, in turn, led to the growth of logistics as a sector in its own right, rather than merely an adjunct to the traditional industries of shipping, distribution, and mass transportation. One prime example is the development of sophisticated computer software that enables companies—Toyota, Dell, and Wal-Mart are the pioneers—to improve their management of supply chains, flexibly expanding or shrinking inventories in response to demand. Another example is in the realm of distribution. The nation's ports have universally turned to “containerization,” which has made uniform the size of all overseas shipments, bolstered automation, and sped up the overall movement of goods, providing dockworkers with greater ability to electronically track containers from origin to end point.

The logistics field is thus now a mainstay of the national economy, and while the economic downturn is projected to slow global trade for the first time in two decades, the growth trend is likely to restart and continue apace over the next five to 10 years. The logistics sector in California currently employs 73,075 people, and is projected to generate 2,788 job openings annually.<sup>12</sup>

To be sure, automation has undoubtedly reduced the absolute number of certain jobs, but it has also transformed the nature of the work and the skills required to do it, creating, in some cases, entirely new occupations. For example, the freight coordinator position traditionally required no formal or extensive training process, creating the danger (and often the reality, especially in non-unionized situations) of low wages and high turnover. Fortunately, the increasing complexity of day-to-day, “on the ground” logistics operations—entailing greater reliance on computer software and more sophisticated tracking equipment—makes possible the transition of the

cargo or freight coordinator position to a genuine middle-skill job, requiring deeper training and usually formal vocational education. This second-tier occupation is increasingly becoming a legitimate “good job,” with living wages, career advancement opportunities, and long-term job security.

Another example of a new logistics occupation is the advent of the green diesel mechanic position to service trucks that run on liquefied or compressed natural gas, a viable alternative to passenger and cargo vehicles that are heavy polluters. See the Clean Trucks Program case study later in this report for an example of how the training of mechanics is changing.

The larger sector of which technical logistics and mechanic positions are a part encompasses large numbers of jobs such as truck drivers and warehouse workers for which middle-skill credentials are not needed. For example, the capital investments proposed in the last Southern California Regional Transportation Plan alone were estimated to produce 98,000 direct new transportation jobs and 32,000 direct wholesale trade jobs.<sup>13</sup>

## Construction Sector—Transportation Facilities and Buildings

Construction represents one of the largest components of infrastructure employment, the most cyclical and challenging to estimate, and, because of the structure of the industry, the most complex with respect to the paths to middle-skill jobs. Currently the sector employs over three million people in middle-skill jobs nationwide, including 514,109 in California. The large amounts of federal ARRA stimulus spending will put idled construction workers back on the job and create an uncertain number of new positions, but it is not designed as a training program. Thus, it is the longer-term growth trends that will determine most of the opportunities for access to middle-skill credentials and employment.

While construction is usually viewed as a promising sector for entry-level positions, the industry's evolution offers abundant career ladders today, in both the traditional trades and in the varied aspects of construction design and management.

Operators, tradesmen, and other skilled positions can, with experience and education, lead to on-site management and supervisory roles and even more schooling and certification can extend that ladder beyond the work site and into project management, corporate headquarters, and planning and design units. These positions make up 39 percent of all employment in the construction sector.<sup>14</sup> They require skills that are often taught by community colleges in conjunction with building trades unions' apprenticeship programs. The challenge, which many communities are now addressing, is to make these construction opportunities accessible to people from all backgrounds.

### ***Transportation Construction***

The transportation construction subsector receives a great deal of attention today as a source of job creation. Ideally, the large number of "shovel-ready" projects means that there can be a rapid turnaround from funding awards to the start of construction, while proposed future investments, such as high-speed rail systems, are on a scale that rivals the largest public works endeavors of past generations.

The Recovery Act allocated over \$8 billion for transit spending and an additional \$27 billion to repair and replace bridges and roads.<sup>15</sup> By the accepted ratios, this alone should create 780,000 jobs in the sector. Under ARRA's state spending formula, California will receive about \$2.57 billion for highways, local streets and roads, freight and passenger rail, and port infrastructure projects, and \$1.07 billion for transit projects.<sup>16</sup> Additionally, California is eligible to apply for funding under other discretionary programs. At the state level, the landmark 2006 Infrastructure Bond Act and 2008's Proposition 1A (targeting high-speed rail) will eventually mean tens of billions of dollars in transportation investment, and thus a likely jobs boom in the construction sector. As the new projects, such as the high-speed rail systems, incorporate greater levels of technology than previous generations of public works, the level of training required for many construction jobs will also continue to rise.

### ***Green Building Retrofitting Construction***

Buildings are responsible for approximately 72 percent of the nation's electricity consumption, and 38 percent of carbon dioxide emissions.<sup>17</sup> Thus, buildings will be prime beneficiaries of efforts to improve energy efficiency and reduce pollutants through retrofitting. For example, weatherization of single and multifamily residential buildings can reduce utility costs by 10 to 50 percent, with upfront costs averaging \$2,500 to \$3,000.<sup>18</sup> Theoretically, lower utility bills will, over time, easily offset the upfront conversion costs for homeowners who choose to make this investment.

The building retrofit sector is viewed as an important job creation driver, since all building types (commercial, residential, and public) are amenable and energy efficiency conversion involves the use of at least a dozen separate job types: heating and ventilation specialists, plumbers, electricians, solar panel rooftop installers, and others. The allocation of this work to the various trades and the creation of programs to teach new skills and reach people who are not already in the unions have rapidly become important focal points for public policy.

There is no shortage of buildings that need conversion. California alone has a housing stock of eight million units constructed before the implementation of the relatively soft 1982 building efficiency standards.<sup>19</sup> A comprehensive retrofit involves several elements of building design and operation, and goes far beyond the weatherization measures, installation of low-flush toilets, and compact fluorescent light bulbs often mentioned.

California's innovative Global Warming Solutions Act of 2006 mandates a reduction in statewide greenhouse gas emissions to 1990 levels by 2020, and state officials are weighing numerous strategies for compliance.<sup>20</sup> At the national level, ARRA allocates \$25 billion to retrofit projects and the act's various weatherization and energy efficiency grants collectively represent one of the largest allocations for a single category of stimulus spending, reflecting the anticipated effect on employment. ARRA's Weatherization Assistance Program allocated \$185 million to California to provide up

to \$6,500 dollars worth of weatherization each to 50,000 low-income family residences.<sup>21</sup>

Using an estimate that every million dollars invested in retrofitting creates eight to 11 jobs, ARRA funding should correlate to 200,000–275,000 new building construction jobs nationwide.<sup>22</sup>

Moreover, if the initial funding from the stimulus proves successful in creating new jobs and reducing energy usage, it is likely that both public and private sector sources will follow with smaller retrofit projects for their specific regions, as the volume of eligible buildings will remain large.

## Utilities Sector

The utilities sector presents an important opportunity for new middle-skill hiring in infrastructure for two reasons. First, baby boomers who retire from jobs ranging from line workers to electrical engineers will need to be replaced. According to a recent U.S. Department of Energy study, some utility companies are anticipating the retirement of as much as half of their line workers, the field’s entry-level or middle-skill occupation. Nationwide, the industry is expected to lose 20 percent of its experienced line workers by 2014.<sup>23</sup> In California, current employment in the utilities sector totals 69,887 jobs, with 2,528

annual job openings.<sup>24</sup> That annual number is expected to grow, since through job replacements alone, California power utility companies will probably need to hire over 22,000 new line workers over the next five years, an average of more than 4,000 per year.

Secondly, even with increased conservation and efficiency of operations, statewide demand for electricity will likely continue growing as the population increases and energy technology changes. From 1990 to 2000, statewide electricity consumption increased 14 percent, while the population increased 11 percent,<sup>25</sup> and over the next 15 years, California’s population is projected to increase by 24 percent.<sup>26</sup>

There are numerous developments in power utilities that are likely to create new jobs. Propelled by the growing green movement and the call for energy efficiency, talk of a national “Smart Grid” has gained momentum. A smart grid is an autonomous power system capable of monitoring buildings to anticipate peak demand times as well as peak use sites.<sup>27</sup> ARRA sets aside \$17 billion for investment in grid development, and, despite the downturn, there remains an abundance of private capital for grid construction, due largely to the solid revenues of the nation’s investor-owned power utilities.<sup>28</sup>

**Table 6. Career Pathways: Power Utilities Worker\***

Occupation	Median Annual Wages	Annual Job Openings in California	Entry/Advancement Requirements
Entry-Level Line Worker	\$53,000	290	Passage of rigorous pre-employment exams
Electrical Line Installers-Repairers	\$57,300		42-month apprenticeship + exams
Electrical Technician	\$57,600	680	36-month apprenticeship + exams
Journeyman Electrician	\$69,200	2,470	36-month apprenticeship + exams

\* California Employment Development Department, *California Occupational Guide*, [www.labormarketinfo.edd.ca.gov/occguides/](http://www.labormarketinfo.edd.ca.gov/occguides/) (accessed 2008).

Developing a smart grid will be a long process, but will eventually create jobs ranging from installation and repair of automated monitoring devices to high-skill engineering and design positions.

By the estimates of a recent study on smart grid development, an initial investment of \$17 billion corresponds to 280,000 new jobs created over the next 10 years, in various occupational categories.<sup>29</sup> Approximately one-third of those positions fall into the category of middle-skill (e.g., meter installation, transformers installation, and field technical support), so we extrapolate that construction and maintenance of a smart grid will create roughly 93,000 middle-skill jobs.

In conjunction with the smart grid, there has been a growing movement for more renewable energy projects to bolster energy independence, improve environmental sustainability, and revive the economy. Some of the career paths generated by this broader energy agenda are discussed in the following section on the green sector.

California's Renewables Portfolio Standard requires the state's three major investor-owned utilities to shift away from their reliance on fossil fuels, procuring or generating at least 20 percent of their electricity from renewable sources by 2010 and higher proportions in later years. In

addition to creating jobs in energy production, an enforced RPS will also necessitate new transmission lines, delivering electricity from the remote locations where solar and geothermal power are generated (e.g., the Mojave Desert and Central California) to the urban centers. Constructing those new transmission lines will fall to the electrical line installers of the utilities.

Table 6 is an illustration of sample career pathways for a utilities worker, with several sample job categories. This sector requires long-term training and apprenticeships in each of the new positions and approval through a set of exams to move up the career ladder. Community colleges provide a diversified applicant pool and successful passage of the exams leading to the entry-level, middle-skill occupations.

## Green Energy Sector

With adequate investment, renewable energy will be the next major growth sector in California, primarily because it builds on skills that already exist in the workforce. For example, solar panel installation combines the skills of electricians and roofers with training specific to solar photovoltaic technology. Wind turbine production involves the same skilled trades found in heavy industrial

### Understanding the Green Economy in California: A Community College Perspective

In a recently released report, the Centers of Excellence began the process of determining what relationships exist between emerging green industry sectors, traditional industry sectors, and college programs that could be adapted to address the training needs for such jobs. The report outlines these relationships in the form of a "crosswalk" to guide community colleges in bringing "green" components into existing training programs, beginning new programs, and in seeking resources through the Recovery Act.

Two other recent reports are also useful for understanding this fast-changing sector in California.

Centers of Excellence, Economic and Workforce Development Program, 2009. <http://www.coecc.net/green/>

Next 10, *Many Shades of Green: Diversity and Distribution of California's Green Jobs*, (San Francisco, CA: December 2009) [http://www.next10.org/next10/pdf/Many\\_Shades\\_of\\_Green\\_1209.pdf](http://www.next10.org/next10/pdf/Many_Shades_of_Green_1209.pdf)

Environmental Defense Fund and Ella Baker Center for Human Rights, *Green Jobs Guidebook* (New York, NY: September, 2008) [http://edf.org/documents/8489\\_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf](http://edf.org/documents/8489_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf)

manufacturing. Repairing vehicles that use alternative fuel fundamentally draws upon principles of automotive mechanics, and retrofitting buildings incorporates skills used by several disciplines in the construction industry. With sufficient work experience and education these higher-skill positions will likewise open up for diverse workers.

Excluding hydropower, renewable energy makes up approximately six percent of all energy production in the United States and is increasing rapidly.<sup>30</sup> The two fastest growing renewable sectors: wind and solar power, have grown an average of 40 percent per year.<sup>31</sup> As noted in the previous section, the state requires that 20 percent of the state's energy be procured from clean energy sources by 2010, and 33 percent by 2020.<sup>32</sup>

Renewable energy includes solar, wind, hydroelectric, and geothermal power, but significant industry and employment growth will likely be confined to the former two sectors over the next five to 10 years. Solar energy comes from two distinct technologies—photovoltaic (or solar PV) and solar thermal. Solar PV uses cells that transform light directly into electricity, while solar thermal uses mirrors and lenses to concentrate sunlight, which in turn heats stored water and creates steam to power an electricity generator. The distinction between them is important from a labor market perspective, as the technologies create different occupational pictures.

Solar PV is suited for local, micro-scale clean energy production. The process involves the installation of solar panels on building rooftops and serves as a key component of building retrofit schemes (as discussed in the Building Construction section). At the local level, models for constructing and financing solar PV installations are underway. In December 2008, Southern California Edison completed installation of a two-mile-long stretch of solar panels across the rooftops of commercial buildings in the state's Inland Empire area.<sup>33</sup> And in February 2009, its Northern California counterpart, Pacific Gas & Electric, announced plans to build a similar ground installation.<sup>34</sup>

Large-scale projects are also being planned, typically with generating capacities in excess of 30

megawatts, using both solar PV and solar thermal technologies.<sup>35</sup> Nearly a dozen large-scale projects are currently under construction in the United States, most scheduled for completion in the next two to five years.<sup>36</sup> These plants, in California, Arizona, and New Mexico, will generate enough electricity to power entire cities and, when coupled with a smart grid, will make a substantial contribution to both state and national clean energy production.

With 73 percent of the national market share, California has long enjoyed a strong position in solar power, from research to manufacturing to installation.<sup>37</sup> But while solar energy is viable long-term, the economic crisis has dried up the private capital resources necessary to support the industry's fledgling firms, slowing growth. The decline in solar investment has not been as steep as in other sectors: even as the financial sector collapsed in the fourth quarter of 2008, capital investment in solar only dropped from \$2.9 billion in the third quarter to \$2.5 billion in the fourth.<sup>38</sup>

At just under two percent, wind power, like solar, is but a small fraction of the United States' current energy production. However, like solar, the wind power industry has shown remarkable annual growth: since 2003, installed wind capacity has jumped from 5,000MW to 19,500MW, and an additional 7,500MW is thought to have gone online as of late 2008.<sup>39</sup> California lies in the country's prime wind corridor, where large-scale wind projects, or "wind farms," are located. Growth in the wind power industry has a strong chance of continuing, stimulated by state RPS mandates, ARRA funding, and private ventures.

Table 7 is an illustration of a full career pathway in the green sector, from the entry-level, middle-skill occupation to the terminal managerial position.

## Water and Wastewater Sector

The operation and management of California's water, wastewater, and storm water systems is not always newsworthy, but is basic to the functioning of our communities. Unlike with other infrastructure sectors, the critical issue in the state's water systems is not so much expansion as it is the repair and

**Table 7. Career Pathways in Solar Installation\***

Occupation	Median Annual Wages	Annual Job Openings in California	Entry/Advancement Requirements
Solar Photovoltaic Installer-Servicer	\$31,200	2,420	Postsecondary coursework and NABCEP certification**
Lead Solar PV Installer-Technician	\$52,000		>1 yr of work experience + certification
Solar PV System Designer/Engineer	\$50,000	510	2-year degree + work experience
Lead Designer	\$83,200		4-year degree + long-term work experience
Operations Manager	\$102,400	500	4-year degree + significant work experience

\* Centers of Excellence, "Solar Industry Environmental Scan," San Francisco Bay & Greater Silicon Valley Regions, California Community Colleges Economic and Workforce Development Program, April 2008, [www.coecc.net/solar/index.asp](http://www.coecc.net/solar/index.asp); Evgeniya Lindstrom, *Solar Technicians Occupational Environmental Scan for California Community Colleges* (San Jose: California Community Colleges Economic and Workforce Development Program, Centers of Excellence, December 2007), [www.greenjobstudies.org/wp-content/uploads/SolarTechs\\_Scan\\_SW\\_08.pdf](http://www.greenjobstudies.org/wp-content/uploads/SolarTechs_Scan_SW_08.pdf).

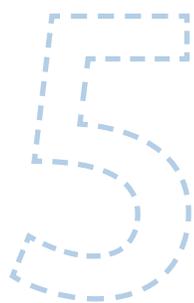
\*\* North American Board of Certified Energy Practitioners.

replacement of aging materials. A 2001 study from the American Water Works Association, the industry trade group, indicates that water and wastewater systems nationwide will require an additional \$6 billion more in annual spending for the next 30 years.<sup>40</sup> Moreover, the 2006 levee break and subsequent flooding of farmlands in the San Joaquin River Valley further proved the fragility of and need for action on the state's water infrastructure. The Recovery Act should boost industry and employment growth in the sector substantially through \$6 billion clean water and wastewater improvement grants and another \$280 million for the California Clean Water State Revolving Fund. Future state water bond issues, if and when they are approved, may also generate a substantial array of repair and construction projects.

Similar to power utilities, the water and wastewater industries face a severe labor shortage in the coming years as a result of Baby Boomers' retirement. Programs such as the one at Cuyamaca College, profiled below, are designed to train

their replacements in the management of the facilities. On the construction and repair side, the Water Infrastructure Network, the nation's leading advocacy coalition in the sector, asserts that every \$1 billion spent on water and wastewater infrastructure improvements will create 35,000 jobs.<sup>41</sup> From this we can extrapolate that ARRA funding will create roughly 210,000 construction jobs nationally in the sector, mostly in water main repair and replacement, and upgrades to treatment plants, both of which will require primarily middle-skill workers in construction and other skilled trade positions.<sup>42</sup> This could mean as many as 130,000 middle-skill jobs during this construction. The Bureau of Labor Statistics tracks only two of the eight identified middle-skill occupations in the sector, so their projections might be somewhat conservative. All told, there should be 235,550 middle-skill job openings nationwide related to the water utilities sector, including construction as well as operations, over the next five to seven years, including about 25,000 in California.





## California Community College Workforce-Training Programs: New Career Pathways to Middle-Skill Infrastructure Jobs

Community colleges across the state have developed an impressive array of workforce-training programs and regional partnerships that are already preparing students to compete for jobs in the state's infrastructure sector. With additional support and connection to effective basic skills, student supports, and adequate financial aid, these programs can be springboards to a better life for many undereducated young adults and dislocated workers.

Through our initial research of the courses, certificates, and degrees offered in one academic year, we identified at least 36 infrastructure-related programs that lead to a degree or certificate that prepare students for entry-level work in the five subsectors of the infrastructure sector we have highlighted in this report. In 2007–2008, students took a total of 250,704 infrastructure sector courses in California community colleges (see table 8). With 182,197 students completing these courses

with a grade C or better, success rates in this workforce track are relatively high (73 percent), compared to other workforce and academic programs. Our analysis of enrollment data provided by the State Chancellor's Office found that 38 percent of the students who successfully completed at least one infrastructure-related course were Latino, 34 percent were white, eight percent were African American, and seven percent were Asian.<sup>43</sup> Of the 6,371 students who earned infrastructure-related certificates or degrees, 37 percent were white, 32 percent were Latino, 15 percent were Asian, and five percent were African American. These participation numbers and yearly success rates are reflective of overall student demographics in the community college system and of the state as a whole.

However, in this same year, the number of students (6,371) who earned a degree or certificate in an infrastructure-related field across the state was small

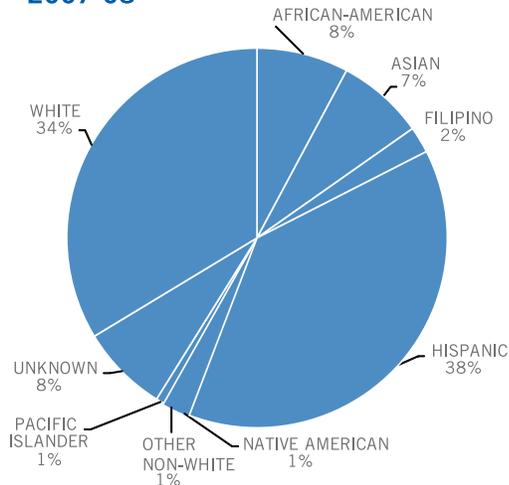
**Table 8. 2007–2008 Student Enrollments in Infrastructure Courses in California Community Colleges\***

Sector	Total Student Enrollments	Total Successful Enrollments**
<b>Construction (building trades, parks, transportation)</b>	<b>178,273</b>	<b>133,296</b>
<b>Utilities (telecom, power)</b>	<b>3,479</b>	<b>2,807</b>
<b>Logistics, Trade, and Transportation</b>	<b>62,477</b>	<b>41,217</b>
<b>Water and Wastewater</b>	<b>6,475</b>	<b>4,877</b>
<b>Infrastructure Sector Courses Total</b>	<b>250,704</b>	<b>182,197</b>

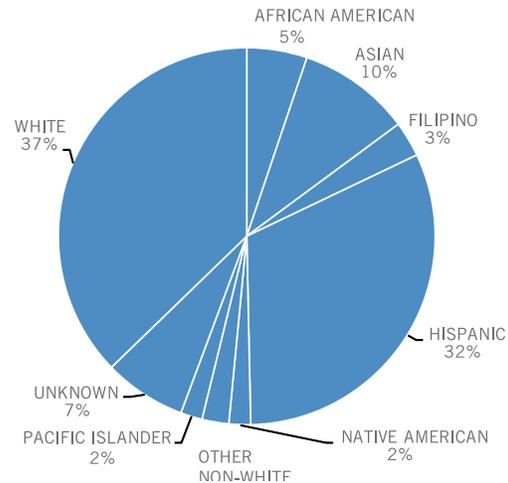
\* California Community Colleges Chancellor's Office, 2008. This is also the source for Charts 3 and 4.

\*\* Students getting a grade of A, B, C, or PASS.

**Chart 3. Successful Enrollments in Infrastructure Courses in CA Community Colleges by Ethnicity 2007-08**



**Chart 4. Total Graduates with Degree or Certificate in Infrastructure in CA Community Colleges 2007-08**



compared to the number of job openings. This is a strong indication that the students and the colleges need much more support to meet the state’s urgent need for trained workers. Table 5, which compares degree completions to the state’s 36,535 annual middle-skill infrastructure job openings, provides a more detailed accounting of this mismatch.

Clearly, there is a need for substantial expansion of community college infrastructure programs. But if such growth is to be effective with students who have not traditionally had academic success, the programs will need to offer more than specific skills training. They will also need to support their students with the academic and financial resources that equity-focused reformers have been promoting for the whole community college system. We turn next to several model programs that have recognized this need and taken up this agenda. Interspersed among the three principal case studies are shorter accounts of several other exemplary and innovative programs.

### Training for Middle-Skill Infrastructure Jobs: Case Studies

Our cases span five regions in California: the San Francisco Bay Area, Los Angeles County, Central Valley, Inland Empire, and the San Diego metropolitan area. The cases feature model

infrastructure-sector workforce-development programs run by community colleges in partnership with business, community-based organizations, public agencies, philanthropy, local high schools, labor unions, and others. They range in function from career preparation programs that help develop “soft skills” needed to succeed in a job to one- and two-year certificate and associate degree programs that provide specific vocational knowledge and skills. These programs serve as fast tracks into middle-skill jobs in the energy and utilities, construction/transportation, logistics, water, and green sectors. The matrix below provides an overview of each program, its region of operation, and the number of students enrolled in the 2008 academic year.

The programs we reviewed do not represent an exhaustive list of infrastructure-related workforce programs in the California Community College system. It is more appropriately described as a *snapshot* of trainings offered across a range of infrastructure-related sectors. We chose to look at these programs in part because they all focus on more diverse recruitment and, to varying degrees, dedicate resources to underemployed and low-income youth and adults. Designed to educate students with a minimum of eighth to 10th grade level skills, such programs serve as on-ramps to new opportunities in the infrastructure sector for those with little academic preparation. Accordingly, we found that most of the programs emphasized

**Table 9. Case Studies of Infrastructure-Sector Workforce-Training Programs in California Community Colleges\***

Region	Community Colleges	Infrastructure-Sector Workforce-Development Programs	Sector Focus	2008 Enrollment	Students Graduated in 2008
San Francisco Bay Area	Laney College, Oakland	PowerPathway, PG&E	Utilities	26	11
	San Jose City College	Silicon Valley Solar Industry-Driven Regional Collaborative	Energy, Green Economy	43	35
Los Angeles Region	Los Angeles Trade-Tech	Utilities and Construction Prep Program, LA Trade Tech	Infrastructure, Utilities	60	50
	Long Beach City College	Green Diesel Program	Transportation, Green Economy	26	n/a
	LA Valley College	Bus Drivers Training Program for LA MTA	Transportation, Energy	148	148
Central Valley	Fresno City College	PowerPathway, PG&E	Utilities	26	26
San Diego Region	Cuyamaca College	Wastewater Management/ Water Technology	Utilities, Infrastructure	45	n/a
Inland Empire	Chaffey College	Advanced Manufacturing IDRC	Transportation, Logistics	n/a	n/a

\* Enrollment and graduation rates as reported by each program

basic skills development and support services to help students overcome academic barriers and other challenges. The programs contextualized classroom instruction to help students improve basic math, literacy, and vocational skills. And from an industry standpoint, the programs seek to address employers' demands for specific workforce skills.

Throughout the remaining sections of the report, we also include brief descriptions of many of the other individual programs and statewide resources that share this commitment to academic support and technical training to open career pathways for young people and adults.

## PG&E PowerPathway Program

<b>Program</b>	Recruit and train workers for entry-level jobs in the energy sector
<b>Regions</b>	San Francisco Bay Area and Central Valley
<b>Highlights</b>	Employer-driven regional workforce development strategy, Effective screening process, Focus on pipeline for underemployed youth and adults
<b>Entry Skills</b>	8th to 10th grade level literacy and mathematics skills

*“When industry and training programs come together it means we are serving youth and making a change”*

—Benjie Williams, center director for Job Corps Treasure Island, on the powerful role employers can play in creating career pathways.

In January 2008, Pacific Gas and Electric Co. (PG&E) launched PowerPathway, a workforce-training program aimed at recruiting and training skilled craft workers and technicians. PG&E was not attracting a diverse pool of applicants to fill several of its career-track entry-level positions. These positions required eighth to 10th grade educational skills and were poised to serve as effective career ladders. There was an opportunity to recruit and train inner-city people of color who were not on a college track. PG&E started the PowerPathway program to address this diversity gap. The PG&E foundation provided seed money to get technical assistance to identify campuses and workforce investment boards to work with them. PG&E also leveraged funds through federal and state grants. The East Bay Career Advancement Academy helped fund the pilot program at Laney College in Oakland. Developed in partnership with local community colleges, local workforce investment boards, and local governments, the program started out to fill several of its jobs that started at \$20 per hour.

As a region-wide employer, PG&E chose to roll out the program across several regions, starting with



the Bay Area and Central Valley. The community college partners put in their own money and resources for the training. The training covers soft skills, test skills, and technical skills. Initial courses were offered at Laney College in Oakland, after which City College of San Francisco, Fresno City College, the College of San Mateo, and Butte

## High-School Career Academies

Career Academies were first established over 30 years ago, as a reform initiative to prepare high-school students for both college and careers. Typically serving between 150 and 200 high school students from grade 9 or 10 through grade 12, Career Academies are organized as small learning communities, combining academic and technical curricula around a career theme and establishing partnerships with local employers to provide work-based learning opportunities. A growing number of academies have been organized around professions and fields concerned with infrastructure.

Architecture, Construction, and Engineering Academy (ACE), South Los Angeles. Nearly 60 percent of South LA students “disappear” from high school before graduation. The majority leave school with few options beyond poverty, low-wage work, or the illegal economy. Opened in the fall of 2009, the ACE Academy at Locke High School in Watts prepares students for high-skilled and high-paying careers in architecture, construction, and engineering. Drawing on the multiple pathways education approach, the high school engages students in rigorous contextualized learning to prepare them for careers in the fields mentioned and satisfies the A-G requirements. The ACE Academy was developed by the Youth and Workforce Development Alliance, a broad-based partnership of community, business, and labor organizations that formed shortly after Community Coalition/Inner City Struggle led a campaign in 2000 to make the A-G Curriculum the default curriculum for all high-school students in the Los Angeles Unified School District.

Community College were added. In the early pilot phase which began in Spring 2008, the program registered 78 students in three classes at Laney, San Mateo, and Fresno community colleges. Of these, 56 progressed to qualify on PG&E’s pre-employment test, called the Physical Test Battery (PTB). At Laney, 55 percent of the class qualified on the PTB, while at College of San Mateo, 73 percent of the class qualified. At Fresno, 100 percent of the class qualified for the test.<sup>44</sup> Of the total students, 43 received offers of employment that ranged from \$19 per hour to \$29 per hour. The Laney College program outcomes were lower because it was the pilot program, and many lessons learned in that cohort were used to improve outcomes at San Mateo and Fresno. Since its inception, 200 women and men have successfully completed the PowerPathway Program; and 60 percent of the graduates were placed in entry level utility worker positions. It is equally important that 55 percent of the graduates are women or persons of color.

PowerPathway exemplifies an employer-driven regional workforce development strategy, and offers some insights into creating effective entry-level, middle-skill job programs and scaling them to serve more people. From prioritizing recruiting and screening for the candidates with higher chances of success to sustaining a talented and substantial faculty to teach their courses and reach out to develop relationships with community, labor, industry, government, community-based organizations, foundations, and state-level educational institutions, the program has evolved to create better outcomes as it expanded. Programs for additional workers, including apprentice electrical technicians, apprentice instrument technicians, apprentice welders, and equipment/field mechanics are in the works, pending receipt of federal and state labor department grants. The program is looking for more community colleges to join in offering new courses that will lead students to career paths with PG&E.

## Silicon Valley Solar Industry-Driven Regional Collaborative

<b>Program</b>	Photovoltaic Installer Training and Apprenticeships in Solar Industry
<b>Regions</b>	San Francisco Bay Area
<b>Highlights</b>	Regional focus, Emerging green-sector jobs, Strong commitment from industry partners
<b>Entry Skills</b>	High-school diploma or GED

The Silicon Valley Solar Industry-Driven Regional Collaborative (IDRC) is a successful regional collaboration between community college districts, solar industry leaders, and economic development agencies. Solar companies employ 16,500 to 17,500 people in California. A third of California's 772 solar companies are in the Bay Area, employing 6,900 to 8,000 workers. Over the next year, the industry is expected to add about 5,000 new jobs in California, almost half in the Bay Area.<sup>45</sup> The Solar IDRC program was created in 2007 by the Silicon Valley Leadership Group, a collaborative of industry and the Economic and Workforce Development programs of Bay Area community colleges. SolarTech, a solar industry consortium of over 40 companies that emerged from the Silicon Valley Leadership Group, identified workforce development as a major barrier to the growth and market penetration of solar photovoltaic installation. The program received funding in September 2007 through the IDRC grant from the state chancellor's office and offers coursework and strategies for student success in pursuing careers in solar and in acquiring a valued industry certification in the solar photovoltaic industry.

The Silicon Valley Solar IDRC represents five college districts: Foothill-De Anza, San Jose-Evergreen, Cabrillo, Ohlone, and West Valley-Mission. The first training was offered in February 2008 in San Jose City College and Cabrillo College, by incorporating existing solar panel installation courses in each college into the IDRC curriculum. The photovoltaic installer training consists of an



average of 80 hours of lecture and hands-on lab experience followed by an optional eight-week internship phase with a solar firm. Faculty persons are part-time instructors, usually experts from the field. The program created resources on campus to offer hands-on training for PV installation. At Cabrillo College, the carpentry department built

## Clean Trucks Program

The recently initiated Clean Trucks Program at the ports of Los Angeles and Long Beach is a “green” policy that will eventually lead to more work and new types of jobs for mechanics. Under this program, short-haul diesel trucks entering the ports are required to meet various green targets over the next few years: first, an outright ban on trucks built before 1989, when diesel pollution standards first went into effect; by 2010, a ban on all pre-1993 trucks and any pre-2003 trucks that have not been retrofitted with natural gas engines; and by 2012, a ban on all trucks not meeting the rigorous 2008 emissions standards. Significantly, the Clean Trucks Program launched at the two busiest ports in the nation, and if the program is an environmental and economic success, it is likely to be emulated by ports across the country. At the occupational level, that entails a reskilling of the traditional diesel and heavy vehicle mechanic positions, mirroring the changing technology. This labor shortage is already being felt in the Southern California ports, where 16,500 trucks will need retrofitting and servicing; if the program spreads, the green diesel mechanic position will experience a dynamic increase in labor demand that official projections cannot capture.

a mock roof on which students could work. With twenty solar panels and several inverters, the students could put classroom theory into practice. Industry partners at SolarTech are committed to offering paid internships and job interviews for those who successfully complete the training. They also contribute guest lecturers and discounted equipment for the classes. The demand for entry into the courses is high—classes typically begin with around 30 students and finish with 20 to 25. In spring 2008, 15 students finished the first semester of training at San Jose City College and concluded by taking the North American Board of Certified Energy Practitioners (NABCEP) exam. Five out of the 17 enrolled students passed the national solar-installer certification test. Five of the students are now installers. The summer 2008 course at San Jose City College started in June

with 22 students and another 29 on a waiting list. The program does not currently include a “pathways” element, as it is built around for-credit community college courses. The program directors have found that underserved program participants are not passing the NABCEP certification exam for solar panel installers at high rates.

The program is raising funds to explicitly target underserved students in outreach/recruitment and plans to tailor curriculum to best meet the classroom needs of these students. In the face of an economic downturn, solar industry employers have found it difficult to hire interns from the program. If the solar industry rebounds and continues to ramp up investment and hiring, the program’s solid partnership with SolarTech should lead to more paid internship and job offers for graduates.

## Project: WaterWorks, Cuyamaca College Water Technology Program

<b>Program</b>	Entry-level and bridge trainings for water industry
<b>Region</b>	San Diego
<b>Highlights</b>	Creating diversity in water industry, Expanding trained workers for jobs in water industry due to retiring workforce
<b>Entry Skills</b>	High-school diploma or GED; ability to take state certification exams

The IDRC grant at Cuyamaca College in East San Diego County began in February 2008 in collaboration with Palomar College in North San Diego County. The aim is to expand recruitment, expand offerings of courses in water technology, and do targeted marketing to recruit diverse applicants for the program throughout the San Diego region. The program was conceived after a regional planning process conducted by representatives from college advisory committees that looked at state and regional surveys and data on employment trends. An estimated 35 percent of the technical professionals in the water/wastewater industry in San Diego County are expected to retire in the next few years.<sup>46</sup> The retirement of senior personnel is likely to result in the loss of valuable knowledge. Further, increased plant automation requires that replacement hires be more technically competent. There is a need to stem the skill drain by creating a new generation of trained professionals for operating and maintaining sewage systems and treatment plants.

Project: WaterWorks reaches out to incumbent workers and provides training for specialized skillsets in the context of changing technology. The program seeks to collaborate with diverse partners and brings together water districts, rural agencies, major job and career developers, community colleges, and high schools. Courses prepare students for certification examinations



administered by the State of California as well as those administered by professional associations within the water and wastewater industry.

Current instructors are experienced water and wastewater professionals, expert and up-to-date in best-of-breed industry practices. The program

## Pre-apprenticeship Programs in Labor Unions: Cypress Mandela Carpenters' Training Program, Oakland

Labor/community partnerships are essential to diversify the apprentice pool in labor unions. Unions play a big role in traditional infrastructure subsectors and should play a strong role in the transition to the new green economy. In early 2005, Construction Employers Association and the Northern California Carpenters Regional Council worked with the joint labor-management Carpenters Training Committee to initiate a pilot Carpenters Pre-apprenticeship Program. The aim of labor and management was to develop more educated and well-rounded apprentices who would be better prepared for the demands of a successful carpentry career. As the workforce ages, developing apprentices into skilled, productive journey-level craftsmen is essential to meet the future labor needs of the industry.

The Cypress Mandela Construction Program prepares young adults for careers in the construction industry. Organized in stages, the training includes: Preconstruction and basic skills training, training in vocational skills needed to secure an apprenticeship in a specific trade, and paid on-the-job training and experience. Participants are also provided counseling and other supportive services. The apprentice graduates are prescreened and better prepared for the physical and practical demands of the industry.

Through a partnership with Laney College and Growth Sector, this fall, Cypress Mandela became the primary education provider for the Oakland Green Job Corps, a new ARRA-funded program that includes fundamentals of solar installation, energy efficiency in buildings, green construction, and an introduction to the principles of ecology, environmental sustainability, and environmental justice. The Cypress Mandela program has a long history of close relationships with the Alameda County Building Trades Council, the individual unions, and community and social justice organizations. Advocacy and organizing campaigns led by the Ella Baker Center for Human Rights, Oakland Community Organizations, the East Bay Alliance for a Sustainable Economy, and a number of other social justice organizations were instrumental in the designation of Cypress Mandela as the primary education provider for the Oakland Green Job Corps.

strengthens paid internship programs by developing relationships between water districts and local high schools. The project will address and train over 20 trainers and about 500 workers.

The water industry has historically hired in fits and starts, with many entrants coming in as veterans from the military. Water agencies operate drinking water and treatment plants, which are high-security zones. It is necessary to conduct background checks for anyone entering the industry, since workers need security clearances. Entry-level jobs in wastewater involve in-field installing and repairing of sewage lines. Minimum qualifications for entry-level jobs in this industry include a high-school diploma or GED and state certification exams for promotion. Approximately 40 percent of the students work in the field and are getting additional credentials; 10 percent are new entrants to the industry;

10 percent are transitioning from careers in the military; and 40 percent are mid-career folks from a different industry learning new skills.

About 16 community colleges in California offer for-credit courses in wastewater, water technology, or reclaimed water. Of these, the majority are in the southern part of the state, with only one, Solano College in the Bay Area, offering these courses in the north. One of the aims of the program is to scale the curricula to allow more community colleges to offer it across California. With this grant, Cuyamaca College has acquired a dedicated space with laboratory facilities that replicate the technology used in water utility plants. The program grant will create lab space with simulated equipment for trainees.





# Policy and Systemic Reform Agenda to Strengthen Community Colleges

Through interviews with the leaders of the programs featured in our case studies, meta-analysis of institutional effectiveness, and feedback from community, college, business, and labor leaders provided in three forums, we developed a good picture of the barriers that must be overcome if community colleges are to serve as viable pathways to careers in the infrastructure arena for undereducated young Californians. Understanding these challenges and the opportunities to address them is essential to developing and advancing a system and policy reform agenda that will ensure that California's massive investment in infrastructure leads to equity and shared prosperity. This section includes two parts—one that provides an overview of key student and program barriers and a second that outlines strategic issues and policy priorities and recommendations.

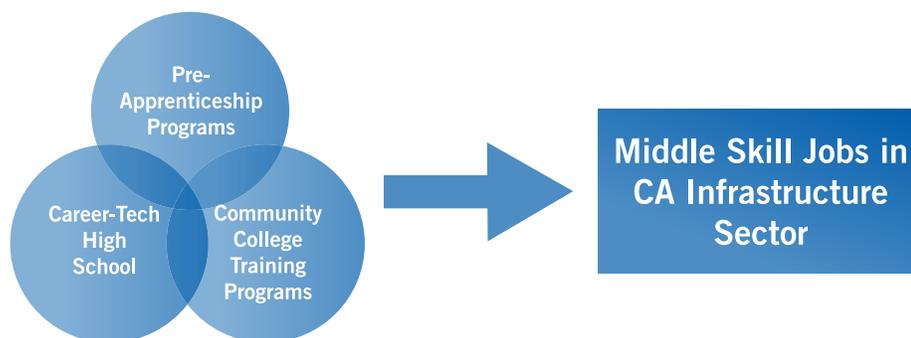
Community college programs exist in a larger environment that includes at least three broad institutional domains for the promotion of career pathways to middle-skill jobs. High-school-based approaches and those grounded in organized labor overlap with each other and with the community colleges, and several of the most

promising examples of those overlaps are profiled in the report. Each domain brings a different set of strengths and partners and reaches a distinct population, and the system works best when its various institutions collaborate effectively.

## Barriers to Student Success

- **Educational Skills Gap.** Significant academic and work-readiness gaps among 18 to 24 year olds pose a challenge to the success of community college programs that are designed to help students move beyond the first rung of the infrastructure career ladder. In some cases (e.g., public transit bus drivers or a brick mason helper), training can be acquired with academic preparation as low as sixth grade reading levels, but reaching the next step in a middle-skill career in all subsectors requires completion of a one-year certificate at minimum. Progressing to the next levels require additional professional certifications, associate degrees, or bachelor's degrees in four-year colleges and universities.

## Chart 5. Career Pathways to Infrastructure Sector for Undereducated Young Californians



- **Lack of Information.** According to program directors, many young adults are not aware of the benefits of pursuing a workforce-related community college education. This is especially true for those students who have dropped out of high school and may think postsecondary education is out of reach.
- **Tutoring and Counseling.** Given the high percentage of low-income students who have low levels of academic preparation and a lack of familiarity with college environments, program directors underscored the importance of providing an intensive array of tutoring and other support services.
- **Inadequate Financial Aid.** A number of recent community college affordability studies have documented the impacts of inadequate financial aid on students from disadvantaged backgrounds. The increase in the percentage of low-income students who must work 20 to 30 hours per week has been one of the key limiting factors identified by numerous studies about low student success rates in California community colleges.
- **Felony or Criminal Backgrounds.** According to program directors and community leaders, students' past history with crime, particularly a felony conviction, poses serious barriers to securing employment in some infrastructure subsectors (e.g., water and wastewater and logistics and transportation). Employers in other subsectors (e.g., construction, utilities, and certain green jobs) are less restrictive. In such cases, programs need to dedicate resources to help students with felonies to clean up their record as part of their outreach and counseling.

## Barriers to Program Success

- **Recruitment, Screening, Selection, and Ongoing Support.** Lack of outreach by employers to candidates who need the training was cited as a barrier to program success. Program directors felt that employers needed to take more proactive roles in recruitment and screening of applicants and that establishing partnerships with community-based organizations that work at the neighborhood level was also critically important. Given the gaps in academic preparation noted earlier, program directors also felt that a more systematic approach to student orientation, academic assessment, and class placement was essential to ensuring that students who entered their high-cost programs succeeded. There is no clear consensus among community college leaders on the matter of limiting access to courses and programs to students who have demonstrated appropriate levels of academic proficiency. However, it is universally understood that substantially greater investment in basic skills education, counseling, and other student support services is critical to the success of the programs.
- **Recruiting Trained and Qualified Faculty.** Given the growing demand for infrastructure-sector vocational training programs, finding trained faculty to teach the technical courses is another barrier. Most instructors are adjunct and work full-time in the industry. This limits the programs' ability to offer daytime and smaller classes. A database of industry professionals and experts would help administrators expand the faculty pool, and a greater coordination of resource materials among workforce programs would help as well.

The growth in the number of community college students who are underprepared in

basic literacy and math poses a significant challenge with regards to the number of qualified instructors. These qualifications include being well versed in teaching methods that include support service approaches that have been proven most effective with young Californians. The California Community Colleges' Basic Skills Initiative and a number of foundations have made substantial investments designed to spur innovation and adoption of promising practices in local community colleges, but more attention and focus is needed in the development of education programs that are integrated components of infrastructure-related workforce programs.

→ **Curriculum and Up-to-Date Knowledge.**

Given the specialized nature of instruction in this field, colleges may find it difficult to find textbooks and to pull together written materials that students will need to keep up with the latest innovations. The program directors we interviewed called for greater coordination and sharing of up-to-date curriculum materials and methodologies among workforce programs.

→ **Sustaining Demand-Driven Models of Workforce Programs.**

Providing demand-driven training can be tricky. It requires the capacity to respond accurately and quickly to a changing labor need. For example, community colleges can create short-term training programs to respond to a specific gap between jobs and trained workers, but if the demand is short-term, it is difficult to recoup the costs the community college incurs by responding quickly. In other cases, community colleges have developed programs that respond to an important societal need that cannot be financed strictly by the private sector due to changes in the economy. For example, community colleges in the Silicon Valley have developed very effective training programs in anticipation of increased demand for solar panel installation in the public and private sector, but the economic downturn has made it more

difficult for residential homeowners and the public sector to pay for solar panel installations. And yet, the emphasis on spurring energy efficiency in public sector may result increased demand for the trained workers. Likewise, the inclusion of \$5 billion for weatherization of homes for low-income families may also create demand for students who have training in energy efficiency-related programs.

→ **Coordinating Effective Regional Partnerships.**

Many of the program directors agreed that providing low-income youth and adults educational pathways to jobs with good career ladders requires strong coordination between community colleges, community organizations, and industry leaders. Community organizations play an important role in steering students to workforce programs and providing support services. Internships with employers in the region are a key experience in making the trainings practical and relevant and ultimately serve as the destination for students. On campus, apart from their role in instruction, program directors are responsible for coordinating a variety of student supports, including basic skills classes, tutoring, and other support services, and promoting the program with industry leaders, public officials, and private- and public-sector funders. If these programs are to be taken to scale, community colleges will need greater access to effective technical assistance (e.g., programs like those provided by the Career Ladders Project) and assistance in breaking through barriers that make it difficult to blend revenue from existing public sources (e.g., Workforce Investment Act, Adult Basic Education, state grants).

→ **Adequate and Sustainable Funding.**

Program directors and other community college leaders identify adequate funding as one the most important barriers to sustaining successful infrastructure-related workforce education programs in community colleges. Training for

infrastructure jobs that require mastery of specialized equipment incurs much higher costs than traditional classrooms. There are costs incurred by the college to coordinate each campus' resources and leadership with the mix of partners (e.g., community-based organizations, industry leaders, public agencies) required to ensure student progress from training to job placement. There are additional costs to provide under-prepared or more financially needy students with a greater array of academic and career counseling. If these programs are to be successfully scaled up, the full costs of operating an effective community college workforce program will have to be accounted for in a more systematic and sustained manner.

It is also vitally important that funding challenges be addressed from a college and system level. The ongoing state budget crisis has had dire impacts on community college students, particularly those who must overcome financial and academic barriers to realize their academic goals. According to the Community College League of California, the budget reductions in 2009–2010 resulted in deep cuts to the total number of courses offered in community colleges across the state—making it much harder for students to enroll in courses needed to make progress toward transfer or a workforce certificate or degree. This came at the very moment when cuts to the CSU and UC Systems, as well as steep increases in student fees, have had the effect of “pushing down” to the community colleges large numbers of students who would normally attend California's public four year colleges and universities. City College of San Francisco, one of the exemplars in basic skills and workforce education, has had to take the drastic measure of closing summer session altogether. The decision by the Legislature and governor to provide college presidents with the flexibility to determine which categorical programs to preserve in order to close campus budget gaps has resulted in deep cuts to the support programs vulnerable students need to succeed.

As the Legislature and Governor work to close a projected \$19 billion dollar deficit in the 2010-2011 budget, it appears that the state's support will accommodate a two percent increase in community college student enrollment—far below the growth most community colleges experienced in this current academic year. The proposed budget includes a \$10 million dollar cut to the Extended Opportunity Program Services (EOPS), which provides counseling and other supports to low-income and underrepresented students. It is unclear how the Governor and Legislature will make good on the promise to reverse the \$45 million dollar cut to the Competitive Cal Grants Program that was originally proposed. This state grant program is one of the only sources of scholarships for older, low-income community college students with good academic records. If this cut is approved, no additional Competitive Cal Grants would be awarded beginning in the fall of 2010. If state leaders are unable to resolve these structural finance challenges, the resulting budget is likely to erode the student success gains made by colleges that have undertaken equity-based system reform efforts in the last several years. This could permanently jeopardize the capacity of community colleges to provide vulnerable Californians with access to effective workforce training programs.

The mismatch between burgeoning student enrollment, the real costs of providing quality instruction and support services, and the funding the state provides colleges will continue to put quality workforce training programs at risk when vulnerable Californians most need access to them. It is difficult to imagine college presidents opting to keep high-cost workforce-training programs with smaller course enrollments open when a more traditional liberal arts course can accommodate greater numbers of students with much lower costs. As colleges are pushed to demonstrate higher completion rates to degrees and transfer, it seems logical that some colleges will focus their resources on those students who enter their doors more prepared to succeed, whether that be in the workforce or transfer track.



## System- and State-Level Challenges and Policy Recommendations

**A**mong researchers, community college leaders, business, community leaders, and policy makers there is a remarkable degree of consensus about the program, system, and policy reforms that are needed to strengthen and expand the community college career pathway to middle-skill jobs in California's infrastructure sector. There are seven categories of strategic recommendations for doing so:

- **Workforce preparation needs to be a significant and distinct part of the overall reform efforts to enhance student success across the state's K–16 educational pipeline.** Additional alignment is needed between the career technical education and the rigorous academic curriculum that is required for admission to the state's four-year colleges and universities. Most agreed that using a multiple pathways approach was the most promising policy and institutional change approach. Several researchers and education leaders suggested that an equity-based framework should be used to collect data on students' progression through the entire publicly-funded "P–20" (preschool through graduate school) education system. State-level policy reforms are also needed

to improve student success across these systems and should measure the success of those working toward one- and two-year workforce certificates and credentials.

- **There is a great need to align, coordinate, and strengthen the high-school, community college, and apprenticeship programs that serve as the principal pathways to middle-skill jobs in this sector.** An important first step is to facilitate articulation agreements between existing community college programs and state-approved apprenticeship programs. A clear process for transferring of technical credits across systems is needed. Program practitioners and community advocates agreed that "stackable and transferable credits" are essential if undereducated, low-income youth and adults are to build on their learning over a lifetime, during which they will likely change jobs—if not occupations—several times.
- **Community college workforce-education programs face many of the same systemic challenges to student success as the academic programs**

### Student Support Models

With the goal of increasing the success of young, low-income, and academically underprepared California students, MDRC's Student Support Partnership Integrating Resources and Education (SSPIRE) initiative provided support to faculty and administrators of nine community colleges. Over the three years of this initiative, each campus team undertook a variety of strategies to strengthen their support services and better integrate these services with academic instruction. They participated in a learning network with faculty and administrators from the other campuses. MDRC's evaluation of the gains made through the various strategies and the cross-cutting lessons from the initiative should inform system- and state-level policy discussion about priorities for state spending and accountability for community colleges. See the following link for greater details: [www.mdrc.org/project\\_31\\_77.html](http://www.mdrc.org/project_31_77.html)

**that are focused on transfer to four-year colleges, and the curriculum must respond to those same challenges.**

Lack of proficiency in basic math, reading, and writing remains a serious barrier for many community college students. The success of infrastructure training programs for low-income communities and communities of color depends on improving the quality of teaching. While there are a number of organizations focused on doing this, significantly more financial and technical resources are needed.

- **A strategy to prepare students for career pathways in infrastructure cannot succeed without broader improvements to the community college system.** Small model programs cannot typically expand without addressing structural deficiencies of the institution as a whole. Any effort to grow

infrastructure-related programs will need to be accompanied by a systemic effort to improve student support services, develop innovative curricula that link academic advancement with workforce knowledge and skills, and overhaul the system by which community colleges are financed.

Fortunately, much of what is needed is already well known among community college leaders, and among the organizations and leadership coalitions that are addressing the institutional barriers to student success. With the strategic investments of foundations including Hewlett, Lumina, Ford, Gates, James Irvine, and Walter S. Johnson, a great deal has been learned about effective basic skills education and student support models. The challenge is to translate these model programs into institutional practices in California's 110 community colleges. Toward this end, we provide descriptions

## Development Education and Basic Skills

The Carnegie Foundation's Strengthening Pre-Collegiate Education in Community Colleges (SPECC) initiative is an action-research project with the goal of strengthening teaching and learning in precollegiate mathematics and English language arts courses at 11 California community colleges. Through SPECC, teams of faculty on each campus were guided through inquiry processes that examined a wide range of data, including examples of student work, classroom observations, and quantitative campus data about student success. The lessons learned by faculty, administrators, researchers, and project directors, as well as an impressive array of resources and tools other colleges can use to support faculty inquiry can be downloaded at: [www.carnegiefoundation.org/general/sub.asp?key=26&subkey=1828&topkey=26](http://www.carnegiefoundation.org/general/sub.asp?key=26&subkey=1828&topkey=26). See the following link for greater details: [www.carnegiefoundation.org/specc](http://www.carnegiefoundation.org/specc).

## The Basic Skills Initiative (BSI)

The State Chancellor's Office and the Academic Senate of California Community Colleges launched this statewide initiative in response to the CCC System's 2006 Strategic Plan, to ensure that basic skills development is adequately funded and becomes a major focus of institutional effectiveness work in the colleges. Coordinated by a local college district (initially the Foothill-De Anza CCD and currently the Los Angeles CCD), the BSI draws on research, curriculum models and tools, and financial resources of a wide range of partners, including: leading faculty practitioners, the Center for Student Success, many of the intermediaries highlighted in this section, and philanthropy. Apart from these important technical assistance resources, in the first two years of the BSI, each local college was able to draw on state funding to organize local professional development activities and experiment with new curricular approaches. See the following link for greater details: <http://cccbsi.org/about>.

throughout this section of eight of the most promising system change efforts, whose efforts ought to be the basis for future action.

→ **Steps should be taken to align state finance policy with system efficacy and accountability, in order to promote student success.** The dialogue about funding of community colleges has included proposals to shift the financial incentives from the current approach of reimbursement based on student enrollment early in the semester to one that is based on student success at the end of the term. In short, the rewards would be more for results than for simply enrollment. An accountability framework tied to funding is needed,

but it needs to be one that recognizes, measures, and responds to the community colleges' multiple missions and covers the actual costs of meeting those missions. This need for a good match between mission and financing incentives has particular salience for technically-oriented workforce preparation, with its specialized facilities and instructors, industry partnerships, sensitivity to changing job markets, and other factors.

→ **Community colleges need to address the most pressing equity and opportunity dilemmas in the broad civic partnerships that are leading the transition to a greener economy at the regional and state levels.** In our various conversations

## Equity-Oriented College and System Reforms

Working in partnership with more than two dozen California community colleges, The Center for Urban Education at the University of Southern California and California Tomorrow have developed effective models and tools that diverse cadres of faculty, administrators, and student leaders can use to lead rigorous assessment, learning, and planning to strengthen institutional capacity to successfully educate their ever-more diverse student bodies. Over the last decade, this work has led to a clear understanding of the institutional practices and student supports that have proven to boost academic achievement among low-income students, immigrants, and students of color. California Tomorrow has developed a set of student support principles that could be used to guide system level reforms and policy decisions about community college finance issues. See the following links for greater details: [cue.usc.edu](http://cue.usc.edu); [www.californiatomorrow.org](http://www.californiatomorrow.org).

## ConnectEd: The California Center for College and Career

ConnectEd is dedicated to advancing policy, research, and practice to ensure California's high schools succeed in preparing students for success in college and future careers. ConnectEd's Multiple Pathways high-school curriculum model bridges the divide between the A-G Curriculum (based on eligibility requirements for admission to the University of California and the California State University) and Career Technical Education. Building on evidence that greater numbers of underprepared students are thriving academically through contextualized learning models, ConnectEd's Multiple Pathways high-school programs connect learning in the classroom with real-world applications outside of school. Set in the context of one of California's 15 major industry sectors, each of the Multiple Pathway high-school experiments integrates rigorous academic instruction with demanding technical and field-based learning. Several of the industry sectors included in the Multiple Pathway curricula have the potential to prepare students for middle-skill jobs in California's infrastructure sector, including building and environmental design, energy and utilities, engineering, transportation, manufacturing, agriculture and natural sciences, and information technology. ConnectEd was created with the support of the James Irvine Foundation. See the following link for greater details: [www.connectedcalifornia.org](http://www.connectedcalifornia.org).

## Technical Assistance for Establishing Career Ladder Community College Workforce Pathways

Established in response to the California Community College Board of Governors' Ladders of Opportunity policy, the Career Ladders Project (CLP) develops policy initiatives and provides strategic and technical assistance to colleges and their workforce partners in building regional career pathway and bridge programs for underserved students and communities. With funding from the State Chancellor's Office and several foundations, CLP has developed several groundbreaking initiatives that should be closely watched as models for expansion and to inform system and policy reforms proposed in this report. The Career Advancement Academies, which were established to provide underprepared and unemployed youth and adults (ages 18 to 30) with career pathways to high-wage jobs in growth sectors in the East Bay, Central Valley, and Los Angeles, offer important lessons about the strategies with the greatest potential for success. Chief among these are the following: the use of cohort-based "learning communities" and a full range of student support; the integration of workforce readiness, career guidance, and contextualized learning to accelerate student progress; and building of strong local partnerships that include industry, community-based organizations, and philanthropy. The Gateway Project, which brings community colleges together with workforce investment boards, K–12 schools, business, and community-based organizations, is creating bridges to college and careers for disconnected youth in six California counties. The Gateway Project's work dismantles regulatory barriers to the blending of federal, local, state, and philanthropic dollars and offers important lessons for the sustainability of regional workforce partnerships. See the following links for greater details: [www.careerladdersproject.org](http://www.careerladdersproject.org); [www.cccco.edu/ChancellorsOffice/Divisions/AcademicAffairs/CareerAdvancementAcademies](http://www.cccco.edu/ChancellorsOffice/Divisions/AcademicAffairs/CareerAdvancementAcademies); [www.careerladdersproject.org/projects/gateway.php](http://www.careerladdersproject.org/projects/gateway.php).

## The American Graduation Initiative: Stronger American Skills through Community Colleges

In July 2009, the president's Council of Economic Advisors issued a report that found that Americans will need postsecondary education to compete successfully for well-paying jobs over the next decade.<sup>47</sup> In addition, occupations requiring only an associate or vocational degree are projected to grow faster than those requiring a bachelor's degree. In response, the Obama administration has launched a 10-year initiative to strengthen America's community colleges. Calling on all American adults to commit to at least one or more years of postsecondary education or career training, the initiative calls on community colleges to graduate an additional five million students by 2020. Apart from increasing levels of financial aid, supporting modernization of facilities, and providing new training grants for middle skill jobs in high growth sectors, the initiative proposes a new Community College Challenge Fund, which would administer competitive grants to enable community colleges and states to innovate and expand proven reforms.<sup>48</sup> The promising program models, institutional reforms, and partnerships identified for investment are very closely aligned with many of the innovative projects already underway in California under the leadership of the organizations highlighted in this report. Of particular importance is the encouragement of partnerships between community colleges, business, and workforce investment systems that will provide new career pathway programs that workers and undereducated adults can use to gain basic education and new work skills. These will be essential in order for such students to succeed in a good career pathway in a growth industry. See the following link for greater details: [www.whitehouse.gov/blog/Investing-in-Education-The-American-Graduation-Initiative](http://www.whitehouse.gov/blog/Investing-in-Education-The-American-Graduation-Initiative).

and forums we consistently heard from community, labor, business, and educators that while there are reasons to believe the green sector will create a new era of economic prosperity, there is no guarantee that those hit hardest by the economic downturn will have a place at the table. Labor union leaders point to significant number of construction and other trades members who have joined the ranks of unemployed or underemployed in California, a state with some of the highest numbers and percentage of unemployed in the country. Community leaders point to higher rates of unemployment and lack of academic preparedness in low-income communities and communities of color to warn that better educated and recently unemployed middle- and higher-income Californians could take advantage of low-cost community college training and step in to fill the demand for trained workers in the new green sector.

Community colleges in several cities are working in regional partnerships with industry, community, labor, and public officials to retrain incumbent workers and create new pathways out of poverty for Californians who have historically faced barriers to good jobs. In Los Angeles, one such effort, led by SCOPE LA, has

adopted four “Principles for an Equitable Green Economy,” which can serve as a template for other regional partnerships. These principles make explicit the partners’ commitment to creating “high road, family supporting jobs that include protection and enforcement of workplace health, safety, and worker’s rights,” and new training opportunities to ensure equitable access to new job opportunities.

→ **Support for workforce-development programs should be part of the broader economic recovery effort.**

Policymakers may be more sympathetic to targeted investments in community college workforce-education programs that can help vulnerable youth and adults, particularly if these investments are part of a broader recovery strategy for California. Community colleges can help to sustain and expand regional workforce-education partnerships that serve as pathways to high-wage jobs in infrastructure and other growth sectors (e.g., allied health and information technology). Three approaches to advocacy of this kind are underway already:

- **Securing a significant augmentation of existing federal workforce-education programs that community**

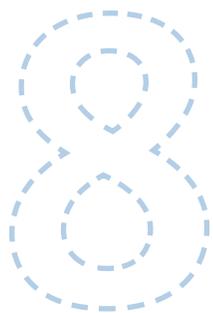
## Achieving the Dream

Achieving the Dream provides community college leaders with research, technical assistance, and connection to other change leaders with the goal of improving their college’s performance in educating low-income students and students of color. Participation is voluntary, but each college must meet a set of requirements that include top-level administrative and financial commitments and development of a cross-college team that can undertake assessment and planning to develop a strategic plan to improve college performance in key areas including teaching, student supports, and data collection. Support from the Lumina, Ford, and Bill and Melinda Gates Foundations has enabled the colleges to carry out these plans. A rigorous study conducted by the Community College Research Center (CCRC) at Teachers College, Columbia University identifies the institutional and management practices that have proven most successful in improving community college performance in serving and educating low-income students and students of color. Based on the comparison of inclusion and equity management practices used by participating colleges with low and high rates of success with this student population, the CCRC study confirms viability of many of the programmatic and system practices called for in this report.<sup>49</sup> See the following link for greater details: [www.achievingthedream.org; ccrc.tc.columbia.edu/Publication.asp?UID=439](http://www.achievingthedream.org; ccrc.tc.columbia.edu/Publication.asp?UID=439).

- colleges can use for training.** ARRA includes programs administered through the Departments of Labor, Energy, Education, Housing and Urban Development, and Agriculture that could be leveraged to ensure that low-income youth and adults receive the training needed to benefit from the roughly \$120 billion dollar investment in urgently needed infrastructure projects.
- **Seeking up front commitments—setting aside a percentage (one to three percent) of the budget for all infrastructure projects for workforce education and job apprenticeships.** These opportunities would connect vulnerable youth and adults to the first rungs in career ladder job opportunities in all infrastructure subsectors that receive federal support. The legislative language supporting this concept in all federal funded highway transportation projects is thus far only encouraging, rather than mandatory, but making it more enforceable at the state and local levels is the subject of intensive advocacy at this time. Legislative bodies and agencies that oversee public investment in infrastructure projects could take the lead in adopting policies to set aside a percentage of project budgets to maintain a trained workforce at the local, regional, and state levels.
  - **Ensuring that the resources associated with the state’s ambitious climate policy (AB 32) are used to strengthen the best**

**aspects of the existing workforce-education system and that inclusion and equity are key elements of the programs that are created.**

The new Clean Energy Workforce Training Program (CEWTP) of the California Energy Commission (CEC) has responded to the advice of environmental, community and labor-led coalitions such as the California Green Stimulus Coalition ([www.californiagreenstimulus.org](http://www.californiagreenstimulus.org)), to incorporate key equity and opportunity provisions. Drawing on federal stimulus funding and working with the California Employment Development Department, the Employment Training Panel, and the California Workforce Investment Board, the CEWTP has awarded \$54 million in new grants to community college and workforce investment board–led regional partnerships to retrain unemployed and underemployed Californians for jobs in green building, clean energy, and alternative and renewable fuel technologies. The CEC grant guidelines for this workforce training program call for applicants to take steps to target unemployed construction workers and youth and adults who live disadvantaged communities. Equally important, the CEC provides incentives for coordination and collaboration with local efforts to revitalize disadvantaged communities (e.g., energy efficiency programs targeting low-income families and affordable housing–related neighborhood stabilization).



## Notes

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- <sup>5</sup> Ibid.
- <sup>6</sup> Ibid., 4–5.
- <sup>7</sup> Executive Office of the President Council of Economic Advisors, *Preparing the Workers of Today for the Jobs of Tomorrow*, (Washington DC: Executive Office of the President Council of Economic Advisors, 2009). [www.whitehouse.gov/assets/documents/Jobs\\_of\\_the\\_Future.pdf](http://www.whitehouse.gov/assets/documents/Jobs_of_the_Future.pdf).
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- <sup>10</sup> Middle-skill sector job categories are an amalgam of occupations that fit our definition of a middle-skill job among the above listed sectors. Numbers were derived from the percentage of jobs available and offered annually within those occupations in the larger sector. For a detailed listing of the occupations used, please contact PolicyLink.
- <sup>11</sup> Ibid.
- <sup>12</sup> The listed categories in table 5, including logistics, represent a synthesis of select middle-skill occupations (strictly defined as including only those jobs that require certification greater than a high-school diploma but less than a four-year degree, pay a living wage, and have expected growth) in key sectors of the workforce. They were compiled from the occupation-specific projections of the California Employment Development Department, California Occupational Guides, [www.labormarketinfo.edd.ca.gov/ocguides/](http://www.labormarketinfo.edd.ca.gov/ocguides/) (accessed 2008).
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