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A Fair and Sustainable Economic Recovery Program for California

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SUMMARY OF STUDY

The COVID-19 pandemic has generated severe public health and economic impacts in California, as with most everywhere else in the United States. This report proposes a recovery program for California that is capable of exerting an effective counterforce against the state's economic collapse in the short run while also building a durable foundation for an economically viable and ecologically sustainable longer-term recovery. This is an anti-austerity recovery agenda, including the following main elements:

Establishing Effective Public Health Interventions. This will generate millions of jobs through allowing the state to recover safely. Some of the industries in which workers have been hardest hit include restaurants and hotels, in-person retail trade, and health care. Workers in these industries all need to be provided with adequate Personal Protection Equipment so they can perform their jobs safely. They also need their rights at work to be fully protected, including the right to paid sick leave.

Upgrading California's Public Infrastructure. California's economy would receive a major boost, both in terms of short-run stimulus and longer-term productivity, by undertaking a large-scale public infrastructure investment program now. The study estimates that $25 billion in annual infrastructure investments in California will generate about 315,000 jobs within the state. Roughly half of these jobs will be in the construction industry, including new opportunities for carpenters, electricians, glaziers, plumbers, pipefitters, and construction laborers. Most of the rest of the jobs will be in manufacturing and a range of services.

Clean Energy Investments and High Road Job Creation. This study estimates that public and private investments in California to achieve the state's mandated emissions and climate stabilization goals are capable of generating about 725,000 jobs in 2020 – 2021 through $80 billion in public and private investments in 2020 – 2021, and larger numbers thereafter to 2030. These investments will entail both: 1) greatly enhancing the state's level of energy efficiency, including through deep energy retrofits to public buildings; and 2) massively expanding the state's supply of clean renewable energy sources, starting with solar and wind power. New job opportunities will open for, among other occupations, carpenters, machinists, environmental scientists, secretaries, accountants, truck drivers, roofers and agricultural laborers.

Just Transition for All Displaced Workers. Some workers in California's oil and gas industry will experience displacement over time through the state's clean energy transition. This study estimates that about 1,400 oil and gas workers will be displaced per year between 2021 – 2030 and another 1,400 will voluntarily retire each year. All of these workers require Just Transition support, including pension guarantees, health care coverage, wage insurance, and retraining support, as needed. In addition to the oil and gas industry, a substantial share of jobs in hard-hit service industries such as restaurants, hotels and retail are likely to not return in the aftermath of the recession. Workers in these industries also need just transition support, including the extension of 100 percent unemployment insurance, Medicare health

insurance coverage while unemployed, wage insurance, and high-road job training and placement support.

Financing a Sustainable Recovery. The California state budget, like all state and municipal-level budgets, faces a severe crisis resulting from the pandemic and recession.

California's state government is facing deep cuts in its spending programs in 2020 – 2021, and almost certainly beyond as well. The same is true for California's municipal government entities. These cuts at both the state and municipal levels will, in turn, contribute to deepening and lengthening the state's recession.

As against this austerity scenario, what is instead needed at present is a viable anti-austerity program—i.e. for California's public sector to significantly *increase* its level of spending at both the state and municipal levels. This will enable the state to strengthen its public health interventions, upgrade its infrastructure and advance the state's clean energy agenda. Increased public spending in these areas will also serve as a necessary counterforce against the sharp decline in private sector spending.

Since the onset of the pandemic, the federal government has injected about $100 billion into the California economy through the CARES Act, which became law in March. Additional funding in the range of $50 – $70 billion would be forthcoming through the HEROES Act. The HEROES Act passed the House of Representatives in April but has not made further progress to passage in the Senate.

This paper describes a total level of funding requirements for California to advance a sustainable recovery to be in the range of $170 billion over the next year. This includes funding in these areas: 1) extension of supplemental unemployment insurance and cash assistance; 2) expanding Medicare coverage to unemployed workers and their families; 3) expanding public health and safety interventions generally, to protect workers and enable the state to reopen safely; 4) maintaining full funding for public education at all levels; 5) upgrading the state's public infrastructure; and 6) clean energy investments to achieve the state's emissions reduction goals.

In terms of finding the funding sources for these measures, the paper concludes by considering the following measures: 1) $50 billion in support for California through a final version of the HEROES Act; 2) U.S. Federal Reserve purchases of California state and municipal bonds at a level of about $60 billion; and 3) California state and municipal governments borrowing the remaining $60 billion on the open bond market. California is presently borrowing on the open market at between about 0.6 percent on 1-year bonds and up to 1.7 percent on 10-year bonds.

1. The Pandemic in California

The State of California, like the rest of the United States, has been experiencing an historically unprecedented public health and economic crisis since the COVID-19 pandemic emerged full force in mid-March.

Table 1 provides some basic statistics on infection and death rates from COVID in California, and for comparison, the U.S. overall as well as in Canada, Japan and Australia. As we see, as of 6/4/20, there have been 120,896 reported cases in California, and 4,423 deaths attributed to COVID. Of course, these figures are tragically high. But it is notable that the infection and death rates in California are much more modest than in the U.S. overall. As Table 1 shows, in terms of infections per million, California's figure at 2,812, is roughly 50 percent lower than the U.S. figure of 5,594 per million. California's death rate, at 112 deaths per million, is roughly 65 percent lower than the U.S. figure of 323.8 per million.

At the same time, in comparison with other high-income countries, California's experience is actually middling to poor. As we also see in Table 1, California's infection rate is about 30 percent higher than that for Canada, while in terms of death rate, California's is about 45 percent lower than Canada's rate. This comparison with Canada is therefore mixed, but generally favorable due to California's lower death rate. However, California's experience is quite poor in comparison with Japan and Australia. These are two countries that have managed the crisis effectively. As we see, California's infection rate is 21 times higher than that for Japan (2,812 vs. 135 per million) and 10 times higher than Australia (2,812 vs. 283 infections per million). The California death rate is 16 times higher than Japan (112 versus 7 deaths per million), and 28 times higher than Australia (112 versus 4 deaths per million). In short, despite the relatively favorable results in California within the U.S. context, the comparative evidence from Japan and Australia make clear that California's public health interventions during the pandemic could be much more effective.

TABLE 1
California COVID-19 Infection and Death Rates in Comparison with USA, Canada, Japan and Australia
Figures as of 6/4/20

	Total Confirmed Infections		Total Confirmed Deaths	
	# of Infections	Infections per Million	# of Deaths	Deaths per Million
California	120,896	2,812	4,423	112.0
USA	1.84 million	5,594	106,530	323.8
Canada	92,228	2,446	7,431	198.7
Japan	17,132	135	901	7.1
Australia	7,131	283	101	4.0

Sources: : https://ourworldindata.org/coronavirus-data for country-level data. https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html for California data.

This becomes especially clear when we focus on some of the particulars as to who is getting infected and dying from COVID-19 in California. Some crucial considerations include these:

1. Health care workers in California have been hit hard by the virus. Statewide, 7,977 had tested positive as of 5/15/20, accounting for 11 percent of total infections at that point. The number continues to grow since state officials started releasing tallies.[1]
2. Nursing homes are a tragic focal point of the statewide outbreak. As of 5/29/20, there have been 1,735 nursing home residents and workers who have died from COVID-19, 41 percent of the statewide total.[2]
3. The black, indigenous, and people of color (BIPOC) communities are experiencing far higher death rates than whites. In Los Angeles County, for example, the death rates are 13 per 100,000 people for whites, 26 for blacks, 22 for Latinx, and between 53 – 154 for Hawaiians/Pacific Islanders.[3]
4. People in lower-income neighborhoods have infection and death rates that are roughly twice those in higher-income neighborhoods. In Los Angeles County, in areas where more than 30 percent of residents live in poverty, 303 people per 100,000 residents were infected, compared with 156 people per 100,000 in areas where less than 10 percent live in poverty. Residents of those low-income communities also are more likely to die of the virus, at a rate of 15 deaths per 100,000 residents, twice the rate of people in the wealthier areas.[4]

Clearly, the state's COVID-related public health interventions need to focus, in particular, on supporting health care workers, nursing home residents and the state's BIPOC communities.

2. California's Economic Collapse

As with the U.S. economy overall, the California economy has experienced an unprecedented collapse resulting from the COVID pandemic. Thus, California's GDP fell by 1.2 percent from January – March (4.8 percent on an annualized basis). The most recent 4/29/20 estimate from the UCLA Anderson School is that, over the second quarter, between April – June, California's GDP will fall further, by a massive 10 – 12.5 percent (30 – 40 percent annualized). The Anderson forecasting model predicts a further decline in California's GDP of 1.25 percent in the third quarter, between July and September, before approximately stabilizing between October and December.[5] If these forecasts are roughly accurate, they imply that the California economy will contract by about 10 percent overall in 2020. By contrast, during the worst phase of the Great Recession between 2008 – 09, California's GDP fell by 4.0 percent.

We can obtain a more detailed perspective on California's current economic crisis by examining data on statewide unemployment insurance claims, broken out on an industry-by-industry basis. We report these figures in Tables 2 and 3. The figures are initial claims to receive unemployment insurance, as they are reported on a weekly basis, divided by industry employment levels. The unemployment insurance claim figures cover the period March 15 – May 9. The underlying level of industry employment data are from the third quarter (July – September) 2019.

To begin with, we see that based on this measure of initial unemployment insurance claims as a share of employment, what we can term California's overall "job loss rate" was 23.8 percent between March 15 and May 9, equal to about 4.6 million people. The comparable figure for the U.S. overall was 22.3 percent, equal to about 37 million people. By comparison, during the Great Recession of 2007 – 2009, the monthly unemployment rate in California peaked at 12.3 percent in October 2010, some months after the recession officially ended. For the U.S. overall, unemployment peaked at 10.0 percent, also in October 2010.

In terms of industry-specific data, the first set of figures in Table 2 presents job loss rates *within* each industry, both for California and the U.S. overall. The second set of figures in Table 3 shows the contributions, industry-by-industry, to California's *overall* job loss rate of 23.8 percent and to the U.S. overall rate of 22.3 percent. In the second set of figures, I incorporate the size of each industry in terms of employment prior to the crisis. This allows us to measure the relative contribution of each industry to overall job losses based on both 1) the size of the industry; and 2) the industry's job loss rate. Here again, we compare the figures for California with those for the U.S. overall.[6]

As we see first, in Table 2, the deep economic decline is being experienced across virtually all industries in California. Arts, entertainment and recreation have faced the most severe employment downturn, with a job loss rate of 54.1 percent between March 15 and May 9. Accommodation and food service, other services, retail trade and construction were not far behind. Job losses within these industries in California ranged between 30 – 48 percent over this period.

But moving further down list in Table 2, we see that no industries in California for which we have data have been exempted from major employment losses. Thus, management of companies/enterprises and finance had the lowest job loss rates in the state over this

TABLE 2

Job Losses Within Industries, California and U.S. Percentages

Figures are weekly initial unemployment insurance claims between March 15 and May 9 as pct. of industry employment levels as of 3rd Quarter (July-Sept) of 2019

California: *Job Loss Rate, Based on Initial Unemployment Insurance Claims = 23.8%*		**United States:** *Job Loss Rate, Based on Initial Unemployment Insurance Claims = 22.3%*	
Arts, entertainment, recreation	54.1%	Accommodation and food services	47.7%
Accommodation and food service	47.9%	Arts, entertainment, recreation	45.1%
Other services	41.5%	Other services	38.8%
Retail trade	36.7%	Retail trade	29.3%
Construction	30.0%	Administration, waste management, remediation	27.0%
Information	25.3%	Construction	26.1%
Administration, waste management, remediation	25.1%	Manufacturing	24.5%
Real estate, rental, leasing	25.1%	Real estate, rental, leasing	20.8%
Wholesale trade	22.1%	Information	19.9%
Mining, oil and gas extraction	22.0%	Transportation, warehousing	18.7%
Manufacturing	19.8%	Wholesale trade	18.6%
Health care and social assistance	19.3%	Health care and social assistance	18.4%
Transportation and warehousing and utilities	15.4%	Mining, oil and gas extraction	17.9%
Professional, scientific, and technical services	15.1%	Professional, scientific, and technical services	12.6%
Educational services	12.3%	Management of companies	9.7%
Agriculture, forestry, fishing, hunting	8.4%	Agriculture, forestry, fishing, hunting	8.4%
Finance and insurance	8.1%	Educational services	8.0%
Management of companies	8.0%	Finance and insurance	4.5%
Public administration	NA	Public administration	3.5%
Utilities	NA	Utilities	1.8%

Sources: U.S. Labor Department; data on weekly unemployment insurance claims by industry were compiled by researchers at the Economic Policy Institute (https://economic.github.io/ui_state_detailed/).

period, at around 8 percent, while 15 of the 18 total industries with reported figures had job losses in excess of 10 percent.

The pattern for the U.S. is also basically consistent with that for California. As with California, the four most hard-hit industries in the U.S. are accommodations, arts, other services, and retail trade, while 17 of the 20 industries listed had job loss rates at 8 percent or higher. These figures tell us that an economic recovery program for California should include the same basic features as that for the U.S. overall.

In Table 3, we see that there are three industries in California whose contribution to the state's overall 23.8% job loss rate between March 15 and May 9 is at nearly 3 percent or higher. These are accommodation and food service, with a 4.7 percent contribution, retail trade, with a 3.4 percent contribution, and health care and social assistance, with a 2.9 percent contribution to the overall statewide job loss rate. With respect to health care, as we

TABLE 3
Share of Total Job Losses by Industry, California and U.S. Figures

Figures are weekly initial unemployment insurance claims between March 15 and May 9 weighted by industry share of total employment

California: *Job Loss Rate, Based on Initial Unemployment Insurance Claims = 23.8%*			**United States:** *Job Loss Rate, Based on Initial Unemployment Insurance Claims = 22.3%*		
	% of state employment	**Industry job loss as % of overall state unemployment**		**% of U.S. employment**	**Industry job loss as % of overall U.S. unemployment**
Accommodation and food service	9.9%	4.7%	Accommodation and food service	9.8%	4.7%
Retail trade	9.4%	3.4%	Retail trade	10.5%	3.1%
Health care and social assistance	14.9%	2.9%	Health care and social assistance	15.1%	2.8%
Construction	5.2%	1.6%	Manufacturing	8.7%	2.1%
Administration, waste management and remedial services	6.5%	1.6%	Administration, waste management and remedial services	6.4%	1.7%
Manufacturing	7.6%	1.5%	Construction	5.3%	1.4%
Other services	3.2%	1.3%	Other services	3.1%	1.2%
Arts, entertainment and recreation	2.2%	1.2%	Arts, entertainment, recreation	2.0%	0.9%
Professional, scientific and technical services	7.7%	1.2%	Professional, scientific, and technical services	6.6%	0.8%
Educational services	7.5%	0.9%	Transportation and warehousing	4.3%	0.8%
Wholesale trade	3.9%	0.9%	Wholesale trade	4.0%	0.7%
Information	3.2%	0.8%	Educational services	7.8%	0.6%
Transportation and warehousing	4.9%	0.7%	Information	2.0%	0.4%
Real estate, rental and leasing	1.7%	0.4%	Real estate, rental and leasing	1.6%	0.3%
Agriculture, forestry, fishing and hunting	2.7%	0.2%	Management of companies/ enterprises	1.6^	0.2%
Finance and insurance	3.1%	0.2%	Finance and insurance	4.1%	0.2%
Management of companies/ enterprises	1.5%	0.1%	Public administration	5.2%	0.2%
Mining, oil and gas extraction	0.1%	0.0%	Agriculture, forestry, fishing, hunting	0.9%	0.1%
Public administration	4.9%	NA	Mining and oil and gas extraction	0.5%	0.1%
Utilities	NA	NA	Utilities	0.5%	0.0%

Sources:U.S. Labor Department; data on weekly unemployment insurance claims by industry were compiled by researchers at the Economic Policy Institute (https://economic.github.io/ui_state_detailed/).

saw before, the industry's overall job loss rate, at 19.3 percent, is not among the highest in the state. But the contribution of the health care industry to overall job losses is nevertheless the third largest. This is because employment in health care represents 14.9 percent of all employment in California. By contrast, as we saw in Table 2, the job loss rate within the arts, entertainment and recreation industry is much higher, at 54.1 percent. But this industry only employed 2.2 percent of all workers in California.

After health care, there are fully 9 industries whose contribution to the state's overall 23.8% job loss rate ranges between 0.7 and 1.6 percent. These include construction, waste management and manufacturing.

The overall result we obtain from Table 3 is that California's unemployment crisis is spread widely across industries in the state. It follows therefore that the only viable recovery program would be one that is broadly targeted across the state's entire economy. It would not be appropriate to design a recovery program for the state that is targeted to any small subset of industries.

In addition, we see in Table 3, as with Table 2, that the contributions by industry to California's overall job loss rate is closely matched by the figures for the U.S. overall. Thus, for the U.S. overall, the three industries with the largest relative contributions to overall job loss are also accommodation and food service, at 4.7 percent, retail trade, at 3.1 percent, and health care at 2.8 percent. For the U.S. overall, the contribution of 9 industries ranges between 0.6 and 2.1 percent. We can therefore again conclude from these figures that a recovery program for California should be broadly targeted and closely aligned with similar measures applied to the U.S. economy overall.

At the same time, as a general matter, it will be critical for public expenditures in California to provide the initial momentum for a strong and sustainable statewide recovery. This is so because public sector investments and employment levels—especially in such critical areas as public health, education, infrastructure and a clean energy transition—do not depend on the expectation of profitability that drives private-sector investments. Private-sector profit expectations are generally low during recessions. They are especially low during the current deep recession. These negative profit expectations are not likely to reverse themselves until the economy's public sector foundation is recognized as having been solidified. That is, when the public sector hires workers back into their jobs, this injects higher levels of personal income into the economy, This, in turn will boost private-sector businesses, with rising incomes from public-sector workers leading to increased economy-wide spending. This is why public-sector austerity measures during a recession typically serves to deepen the recession while anti-austerity policies by states can provide an effective counterforce to a private-sector slump.

3. Establishing Effective Public Health Interventions

California's severe economic crisis is a result of the COVID-19 pandemic. As such, any viable economic recovery program for the state must begin with measures that establish and sustain the highest possible standards for protecting public health.

California was the first U.S. state to issue a stay-at-home order, on March 19. The fact that the state moved fairly quickly into lockdown has been credited with its relatively greater success than the U.S. overall in managing the COVID pandemic. At the same time, as we have seen, California's performance has been much worse than high-income countries such as Japan and Australia, which achieved far more successful public health interventions. Japan and Australia have been successful in containing COVID-19 through, first of all, maintaining significantly higher public health staffing levels and providing these health care workers with adequate Personal Protection Equipment supplies. This in turn enabled the public health systems in these countries to identify infected people much more effectively, through some combination of rigorous levels of testing, as well as quarantining those identified as infected and tracing the contacts of the infected.

California began reopening its economy on May 8, enabling retail, manufacturing, offices (where telework is not possible), outdoor museums and limited personal services to reopen within an ongoing set of guidelines to protect public safety, in the areas of distancing and wearing masks. As of May 12, the state began allowing religious, cultural and political gatherings of up to 100 people. It also permitted beauty salons and barbershops to reopen.[7]

The state's cases of infected people have continued to rise sharply since reopening commenced. Thus, between May 21 – June 4, the number of people per day testing positive for COVID increased by 34 percent, from 1,900 to 2,600.[8]

In response to the rapid pace of reopening and the negative public health trends that have resulted, on May 26, a leading public health official in the state, Santa Clara Public Health Officer Sara Cody, argued that the state's reopening was proceeding too quickly. Cody was most disturbed by Governor Newsom's actions to expand the number of people allowed to gather in public, a move she warned would overwhelm "our current ambitious and unprecedented effort" to establish a large network to track and trace the spread of the virus as the state reopens.[9] Similar to Cody, Lee Riley, the Division Head in the program of Infectious Diseases and Vaccinology in the UC Berkeley School of Public Health, recommended halting new relaxations of the lockdown for two incubation weeks at a time.

Conditions for Safe Reopening

At the least, in terms of establishing a safe reopening trajectory for California, the state needs to be in compliance with the Reopening Guidelines set out by the White House program, directed by Dr. Deborah Birx. I list below some of the main features of the Birx guidelines, along with California's situation in these key areas:

Cases

- Downward trajectory of documented cases within a 14-day period.
  - *California continues to see increasing cases.*[10]

Hospitals

- Treating all patients without crisis care.
  - *California's hospital capacity is limited.*[11]
- Robust testing program in place for at-risk health care workers, including emerging antibody testing.
  - *Testing in California has been increasing but remains far below Birx target levels.*

Testing and Contact Tracing

- Ability to quickly set up safe and efficient screening and testing sites for symptomatic individuals and trace contacts of positive COVID cases.
  - *Testing in California has been increasing but remains far below Birx target levels.*[12]
- Ensure sentinel surveillance sites are screening for asymptomatic cases and contacts for COVID positive results are traced. Sites need to be readily accessible at locations that serve older individuals, lower-income Americans, and racial minorities.
  - *Testing equity in California has been poor.*[13]

Health Care System Capacity

- Ability to quickly and independently supply sufficient Personal Protective Equipment and critical medical equipment to handle dramatic surge in need.
  - *California still does not have adequate Personal Protective Equipment for health care workers.*[14]
- Ability to meet a surge in demand for Intensive Care Units.
  - *California's intensive care bed capacity is inadequate.*[15]

Plans

- Protect the health and safety of workers in critical industries.
  - *California's health care worker infection rate has been very high. Conditions for California's "essential workers," the majority of whom are racial minorities, are also inadequate.*[16]
- Protect the health and safety of those living and working in high-risk facilities, including nursing homes and prisons.
  - *41 percent of all COVID-related deaths in California include residents or workers at the state's nursing homes.*[17]
- Monitor conditions and immediately take steps to limit and mitigate any rebounds or outbreaks by restarting a phase or returning to an earlier phase, depending on severity.
  - *California's ability to reinstate lockdown conditions is questionable, given significant resistance.*[18]

In short, the first priority for California advancing a sustainable economic recovery program is to raise the state's public health standards to be in full compliance with the Birx guidelines. Towards that end, the state needs to mandate that all employers be required to provide adequate Personal Protective Equipment to all employees and that all workplaces adhere to adequate social distancing protocols. The state therefore needs to commit significant financial resources to addressing all of the areas in which it is presently deficient. I return to these issues in Section 7 below, focused on budgetary matters.

Expanding Medicare Coverage

The sharp increase in job losses in California, as with the U.S. overall, has meant that millions of unemployed workers have lost the health care coverage they had been receiving through their employer. These workers need to be guaranteed health insurance coverage at least over the full course of the pandemic.

Representatives Pramila Jayapal and Joe Kennedy recently proposed the Medicare Crisis program, as a measure that would be critical in providing support to families over the course of the pandemic and severe economic downturn.[19] Senator Bernie Sanders introduced a similar measure in the U.S. Senate, the Health Care Emergency Guarantee Act.[20]

The Medicare Crisis program would enable anyone who has filed for unemployment insurance due to the COVID-19 crisis to receive traditional Medicare support for themselves and their families. This will include any testing or treatments related to COVID-19 itself. In addition, under Medicare Crisis, the federal government also absorbs all cost-sharing for unemployed workers and their families, including deductibles, co-payments and any additional out-of-pocket expenses. These costs are normally paid by Medicare enrollees themselves.

Further, under the Medicare Crisis program, all ongoing Medicare enrollees—whether or not they have become unemployed due to the pandemic and economic downturn—will receive additional health insurance benefits. This will include COVID-19 testing and treatment at no costs, as well as a cap on cost sharing for all other treatments at 5 percent of income.

To date, neither this Jayapal-Kennedy proposal in the House of Representatives, nor the equivalent Sanders bill in the Senate, have been included in any version of the HEROES Act or any other overall federal stimulus proposals. Nevertheless, a version of these proposals needs to be integral to any recovery project, for California and the U.S. more generally. The reasons include the following:

1. It provides critical income support for workers and their families, especially workers who are already unemployed.
2. It will provide an overall boost to the economic recovery. Otherwise, families of unemployed workers are likely to face major new financial burdens due to their loss of health insurance.
3. Without guaranteed health coverage, people will be reluctant to get tested and treated for COVID. This will therefore prolong the ongoing spread of the virus. As such, it will also inhibit the prospects for a sustainable recovery.

Because this kind of initiative is so critical to a successful reopening and economic recovery, it is a measure that California should enact on its own at the state level if it is not incorporated in any upcoming rounds of federal stimulus legislation. In Section 7, I provide a rough cost estimate of such a statewide proposal.

Workers Rights Protections

The public health provisions described in this section must be matched by a corresponding level of rights and protections extended to all workers in California during the pandemic and economic crisis. As a minimum, all workers in the state must have the right to guaranteed

paid sick leave. Such an initiative should be understood as a measure that protects the health and well-being of the workers themselves but equally, the health and well-being of the overall community. Of course, workers who feel compelled to come to a public workplace even if they are experiencing COVID-like symptoms are endangering the health of the entire community.

In recognition of these considerations, on April 16, Governor Newsom issued an executive order to provide California's food sector workers supplemental paid sick leave for COVID-related reasons. The order covers agricultural workers, grocery workers and food delivery workers throughout the state.[21] In addition, in May, the municipalities of Oakland, Los Angeles City, Los Angeles County, San Francisco and San Jose enacted laws requiring supplemental paid sick leave for all workers employed by firms with more than 50 employees as well as some categories of small businesses.[22] This form of protection should be extended throughout the state, to workers at all business firms, regardless of size.

Of course, all such worker protection measures need to be scrupulously enforced. The central importance of enforcement was highlighted recently with the news that Amazon, one of the state's largest employers, has been flouting the paid sick leave laws. A news story in *The Guardian* on May 8 reports as follows:

> Amazon workers in southern California's industrial heartland say the company's policies are forcing sick employees to work and that warehouses are refusing to comply with a state paid sick leave law meant to prevent Covid-19 outbreaks. In the Inland Empire region outside Los Angeles, Amazon workers told *The Guardian* they fear losing their jobs if they are ill and stay home. At least four Amazon warehouses in the region have recorded Covid-19 cases. On 1 May, Amazon ended a policy allowing unlimited unpaid time off, a measure adopted at the start of the coronavirus crisis that allowed workers to take time off for any reason. They would forgo wages, but if they were concerned about their safety or had new childcare responsibilities due to lockdowns, they could stay home without losing their jobs.
>
> Without the policy, workers say they could now be fired if they miss shifts. They worry the reversal will result in sick and vulnerable people showing up for shifts because they can't risk termination. The health concerns are particularly serious in the Inland Empire, which has some of the worst air quality in the US and disproportionately high rates of asthma and other respiratory illnesses. Employees also shared emails showing that Amazon has dismissed some paid sick leave requests by claiming a California law intended to provide supplemental sick leave during the pandemic does not apply to the warehouses.
>
> "I'm afraid to come to work, but I don't have a choice," said Eddie, a 48-year-old San Bernardino worker with diabetes, who asked to go by his middle name and works in one of the facilities that had an outbreak. "I shouldn't be there. We're risking our safety for the company … The more I think about it, the more stressed I get."[23]

In short, a viable recovery program for California must include an enhanced commitment to protecting workers' rights at all levels of the state economy, starting with the most vulnerable workers, such as those in the Inland Empire's Amazon warehouses.[24]

4. Clean Energy Investments and Climate Stabilization

Even under current pandemic conditions, we cannot forget that we have truly limited time to take decisive action around climate change. The Intergovernmental Panel on Climate Change concluded in October 2018 that the world must reduce carbon dioxide emissions by 45 percent as of 2030—10 years from now—and reach net zero emissions by 2050, in order to retain a reasonable chance of moving onto a viable global climate stabilization path.[25] This means that, within the next 30 years, we must totally supplant our current fossil-fuel dominant energy system with one based on the combination of high efficiency and clean renewable energy sources, especially solar and wind power that gets converted into electricity.

The State of California has committed itself to achieving state-wide emissions reduction targets consistent with the IPCC goals. Thus, in 2018, California passed two major directives to bring its energy policies in line with the IPCC's goals. They are:

Senate Bill (SB) 100 calls for California to completely decarbonize the electricity system by 2045, building on the state's existing goal of reducing all greenhouse gas emissions to 40 percent below 1990 levels by 2030.[26]

Executive Order B-55-18 set the longer-term goal of the state becoming carbon neutral no later than 2045, with net negative emissions thereafter.[27]

Achieving California's emission reduction goals will require, first and foremost, major investments to raise energy efficiency standards in the state and to greatly expand the state's supply of clean renewable energy sources. This statewide clean energy investment project can also provide a strong foundation for the California economy to recover from its current deep recession. In particular, investments in energy efficiency and renewable energy at the level necessary to achieve the state's target of a 40 percent emissions reduction by 2030 will create major new employment opportunities throughout the state.

To illustrate this point, I briefly describe here a clean energy investment program for California scaled at about 2.5 percent of statewide GDP per year, starting at the state's 2019 GDP level of $3.1 trillion. At this GDP level, the clean energy investment spending level would amount to about $80 billion in the initial years of the program, i.e. starting at present, in mid-2020, and moving forward as the economy hopefully proceeds onto a recovery path in 2021. Clean energy investment levels would then increase in 2022 and through 2030 at a rate consistent with the rise of California's GDP in those later years. Investments in energy efficiency and clean renewable energy at this scale between 2020 and 2030 should be sufficient to enable California to achieve the IPCC's goal of a 45 percent reduction in CO_2 emissions by 2030.[28]

Of the roughly $80 billion in total clean energy investment spending in 2020 through 2022, I assume that $20 billion—25 percent—would come from public funds, with the other $60 billion coming from private investors. California has strong regulations and incentives in place to encourage private-sector clean energy investments. These include renewable energy portfolio standards, vehicle emissions standards, net metering in setting electricity prices, and a broad range of financial incentives for clean energy investors.[29]

Clean Energy Investments and Job Creation

In Table 4, I show estimates as to how the $80 billion in total energy efficiency and renewable energy investments will generate employment in California. Specifically, I show estimates for these areas of clean energy investments:

- Energy efficiency: building retrofits and industrial efficiency;
- Renewable energy: wind, solar, and geothermal energy;
- Land restoration, including plugging orphaned oil wells, and renewable agriculture.

Direct, Indirect and Induced Job Creation

There are three sources of job creation associated with any expansion of spending in any area of the economy, including clean energy investments. These are direct, indirect, and induced employment effects. For purposes of illustration, consider these categories in terms of investments in home retrofitting or building wind turbines:

TABLE 4
Job Creation in California Through $80 Billion/Year Clean Energy Investment Program

	Job Creation per $1 Million in Spending				2021 Job Creation at $80 Billion in Spending	
	1. Direct Jobs	2. Indirect Jobs	3. Induced Jobs	4. Total job Creation *(= columns 1+2+ 3)*	5. Budget per Investment Area	6. Job Creation per Year *(= columns 4 x 5)*
Energy Efficiency						
Building retrofits	4.3	2.4	2.4	9.1	$10.0 billion	91,000
Public transit	12.4	1.8	3.1	17.3	$3.0 billion	51,900
Industrial efficiency	4.9	2.1	2.9	9.9	$1.5 billion	14,850
Smart grid	4.6	1.7	2.6	8.9	$1.5 billion	13,350
Renewable Energy						
Wind energy	3.3	1.9	2.3	7.5	$26.0 billion	195,000
Solar energy	3.7	1.9	2.4	8.0	$26.0 billion	208,000
Geothermal energy	6.0	2.2	3.6	11.8	$6.0 billion	70,800
Land and Agriculture						
Land restoration/plugging orphaned oil wells	7.2	2.0	3.2	12.4	$2.0 billion	24,800
Agriculture	9.3	1.3	3.0	13.6	$4.0 billion	54,400
Totals	---	---	---	---	**$80 billion**	**724,100**

Sources: IMPLAN Input/output California Dataset.

1. *Direct effects*—the jobs created, for example, by retrofitting buildings to make them more energy efficient or building wind turbines;
2. *Indirect effects*—the jobs associated with industries that supply intermediate goods for the building retrofits or wind turbines, such as lumber, steel, and transportation. In other words, indirect effects measures job creation along the clean energy investment supply chain;
3. *Induced effects*—the expansion of employment that results when people who are paid in the construction or steel industries spend the money they have earned on other products in the economy. These are the multiplier effects within a standard macroeconomic model.

I report our estimates for direct, indirect, and induced job creation through these specific areas of clean energy investments for California. These figures are presented as jobs created per $1 million in expenditures. I then add the figures for direct, indirect, and induced job creation, to produce an estimate of overall job creation per $1 million in spending in each of the clean energy investment areas.

As we see in Table 4, my estimate is that $80 billion in clean energy investments will generate about 725,000 jobs overall in California. This amounts to an average of about 9 jobs per $1 million in spending within California. I also estimate that an additional 20 – 25 percent of jobs will be created outside of California through these clean energy investments. Focusing on the California labor market specifically, jobs will open up in a wide range of occupations. These include the following:

- *Building retrofits:* construction laborers, carpenters, plumbers and pipefitters, sheet metal workers, insulators, glazers.
- *Public transit:* bus drivers, electricians, machinists, bus mechanics, transit planning managers.
- *Solar and wind energy:* electricians, painters, machinists, environmental scientists, geoscientists.
- *Land restoration and plugging orphaned oil wells:* agricultural laborers, forestry/wildlife technicians, welders, pipefitters, civil engineers.[30]

In addition, all of these clean energy investment projects will generate new employment opportunities for, among others, secretaries, office managers, customer service representatives, and accountants.

This project will also deliver lower energy costs for consumers within a relatively short period of time. This is because energy efficiency investments enable consumers to spend less for a given amount of energy services, such as maintaining comfortable temperature levels in buildings through high efficiency heat pumps as opposed to low efficiency conventional boilers and air conditioning systems. Moreover, the average cost of a kilowatt of electricity produced with wind or solar power is already at rough cost parity or lower than electricity generated with fossil fuels or nuclear power.[31]

Which Clean Energy Projects are "Shovel-Ready?"

Given the recession conditions, it will be a challenge to move the full $80 billion into the state's investment spending stream within the first months of this program. Some activities will inevitably face delays. It is therefore important to take seriously issues around how best to time the launch of various components of the overall project. The point is to ensure that we maximize both their short-term stimulus benefits in addition to their longer-term impacts.

This means that we need to identify the subgroup of green investment projects that can realistically roll into action at scale within a matter of months. One good example would be to undertake energy efficiency retrofits of all public and commercial buildings. This would entail improving insulation, sealing window frames and doors, switching over all lightbulbs to LEDs, and replacing aging heating and air conditioning systems with efficient ones, preferably, where possible, with heat pumps. It is also critical that California's construction industry has been permitted to operate since early May within a framework of COVID-focused public health and safety guidelines.[32]

As we see in Table 4, the energy efficiency investment program will generate about 9 jobs per $1 million in expenditures within California. Thus, $10 billion in energy efficiency investments included in the Table 4 calculations will generate about 91,000 jobs quickly within California, for secretaries, truck drivers, and accountants as well as for construction workers. It is also capable of delivering immediate energy savings of about 30 percent and comparable levels of reduced emissions. Front-loading these projects with larger budgetary outlays will also increase job creation proportionally.

Building off this initial set of truly shovel-ready projects, a full California clean energy investment project, at a spending level of about 2.5 percent of the state's GDP every year until 2030, can then be phased in as quickly as possible. The ramping up of the rest of the clean energy investment program will provide a strong overall boost to the economy in moving out of recession and into recovery.

Just Transition for California's Fossil Fuel Industry Dependent Workers and Communities

Achieving a 45 percent reduction in CO_2 emissions in California by 2030 will, of course, require a major contraction of the state's oil and gas industry. This, in turn, will result in significant job losses for workers within the industry throughout the state, as well as job losses in ancillary industries such as support activities for the oil and gas industry, natural gas distribution and petroleum refining, as well as overall job losses in the state through induced effects.[33]

For this short study, I have produced some rough preliminary estimates of how significant the level of job losses is likely to be resulting from the state's clean energy transition. I also sketch the main features of what would constitute a Just Transition program for these workers experiencing job losses. My co-workers and I will be developing a much more detailed analysis of these issues in forthcoming work.

In Table 5, I present a rough preliminary estimate of the total job contraction in the state, considering separately the direct job losses in the oil and gas industry, then the indirect

TABLE 5
Job Impacts of 50 percent Contraction of California's Oil and Gas Industry, 2021– 2030:
Direct, Indirect, and Induced Job Contractions

A) Preliminary Estimate of Direct Job Losses in California's Oil and Gas Industry

1. Total statewide industry employment	57,516
2. Total job contraction by 2030 *(= row 1 * 0.5)*	28,758
3. Average annual job contraction *(= row 2/10)*	2,876
4. Voluntary retirements year *(= row 3 x 0.5)*	1,438
5. Displaced workers per year *(= row 3 x 0.5)*	1,438

B) Preliminary Estimate of Job Losses in Supply Chain and Overall Economy: Indirect and Induced Job Losses

1. Job contraction in oil and gas supply chain—Indirect job contraction	80,929
2. Job contraction in overall economy--Induced job contraction	30,000 *(preliminary estimate)*
3. Total indirect and induced job contraction *(= rows 1 + 2)*	110,929
4. Average annual indirect + induced job contraction *(= row 3/10)*	11,093
5. Voluntary retirements per year *(= row 4 x 0.5)*	5,516
6. Displaced workers per year *(= row 4 x 0.5)*	5,516

Source: IMPLAN Input/output California Dataset.

and induced job losses resulting from the oil and gas industry contraction—i.e. the jobs that will be lost through the oil and gas industry supply chain within California as well as the losses in the overall economy resulting from the oil and gas industry contraction.

Starting in panel A, we see that, at present, there are roughly 58,000 people employed in the oil and gas industry in California, equal to about 3.4 percent of total employment in the state as of 3/1/20—i.e. prior to the COVID pandemic. If we assume that the industry will experience a 50 percent contraction in activity as of 2030, that means that the overall job contraction by 2030 will amount to about 29,000 jobs. If we then assume a steady rate of industry contraction between 2021 – 2030, that implies job reductions at about 2,900 per year.

In previous studies on the states of New York, Washington, and Colorado, my co-workers and I have done detailed demographic analyses of the workforce in the oil and gas industry. We did this in order to estimate roughly how many workers are likely to reach age 65 by 2030 and choose voluntarily to retire at that point. These workers will not face displacement. But they will need support in terms of protecting the value of their pensions and health care benefits as their employers are facing phase-outs.

In the previous studies we found that, of the total fossil fuel industry workforce, between about 25 – 30 percent are at least 55 years old. We also examined the retirement rates for these workers once they turned 65. We found this to be about 85 percent. For

our discussion here, we therefore assume that 25 percent of the present fossil fuel industry workforce in California of 58,000 will voluntarily retire between 2021 – 2030. That would amount to a bit more than 14,000 workers in total, or 1,400 workers per year. The precise figure I report in Table 5 is 1,438 voluntary retirements per year.

Adding up all these factors, we therefore see in panel A that, of the roughly 2,900 fossil fuel industry jobs that will be lost per year between 2021 – 2030, about half of these—1,438 jobs would be jobs held by workers who are voluntarily retiring over this decade. This leaves us with another 1,438 oil and gas industry workers who would face displacement. These would be the workers who would need to receive a full package of Just Transition support.

Just Transition Program for Directly Displaced Oil and Gas Industry Workers

As in our previous studies for New York State, Washington State and Colorado, the Just Transition program for oil and gas industry workers in California should include the following:

- Pension and health care guarantees for retired workers who are covered by employer-financed pensions;
- Retraining to assist displaced workers to obtain the skills needed for a new job and 100 percent wage replacement while training;
- Re-employment for displaced workers through an employment guarantee, with 100 percent wage insurance;
- Relocation support for all workers who require this support.

Of these measures, the pension guarantees can be addressed at the level of regulatory policy. The budgetary impact on the State of California of these pension guarantees should therefore be modest. In the previous studies, we have estimated that the retraining, re-employment with 100 percent wage insurance, and relocation support should cost an average of about $200,000 per displaced worker. This program, supporting around 1,400 displaced workers per year in California's oil and gas industry, would therefore cost about $30 million per year. This estimate includes support for workers who are close to, but not yet, at retirement age, at the time when their employer undergoes a major contraction or total shutdown. These workers also need Just Transition protections through wage insurance and pension guarantees that will enable them to move securely into retirement.

Just Transition for Workers Facing Indirect and Induced Job Losses

In panel B of Table 5, we then present rough preliminary figures on the indirect and induced job losses that would result in California through a 50 percent phaseout of the oil and gas industry between 2021 – 2030. The calculations I report in panel B are equivalent to those in panel A. The difference in panel B is that the figures are substantially larger, with the figures for both annual retirements and displaced workers now at about 5,500 per year. However, the connections with the oil and gas industry contraction are much looser for most of the

workers who will face job losses via these indirect or induced linkages. Generally speaking then, the 5,500 workers per year that would be facing displacement through indirect and induced job losses should not be eligible to receive the same level of support as the oil and gas industry workers themselves. Rather, those facing displacement through indirect and induced job losses should receive the same Just Transition support that would be available to all workers in California, regardless of the reason that these workers become unemployed. This would include health care support, unemployment insurance, and opportunities for job retraining.

The funding to support these workers would therefore be incorporated into the overall state budget that supports California workers experiencing unemployment. They would therefore be able to receive the expanded levels of both health care and unemployment insurance support that we have proposed above. At the same time, these displaced workers will be able to benefit from the expanding job opportunities that will result through the roughly 725,000 jobs per year that will be generated by the statewide clean energy investment program budgeted at about $80 billion per year.

Overall Employment and Budgetary Impacts

Overall, with this preliminary discussion on the clean energy transition for California over the next decade, we find the following:

1. A clean energy investment program for California that is capable of serving as the centerpiece of the project to lower the state's CO_2 emissions by 45 percent as of 2030 will generate about 725,000 jobs per year throughout the state.
2. We assume that this program will require investment spending for energy efficiency and renewable energy projects of about $80 billion in total in the initial years of the project, i.e. between 2020 – 2021. We assume that, of the $80 billion per year in total investment spending, $20 billion will be public investment and the remaining $60 billion will be private investment. In subsequent years, investment levels should rise along with the overall level of California's GDP. Clean energy investments should remain at about 2.5 percent of California's GDP until 2030.
3. Approximately 58,000 people are now employed in California's oil and gas industry. As a preliminary figure, I estimate that approximately 1,400 per year will face job displacement as a result of the industry contracting by about 50 percent between 2021 – 2030. These workers will require a full set of Just Transition policies to support them, including job retraining opportunities; an employment guarantee with 100 percent wage insurance; and relocation support, as needed. A program at this level of support will cost approximately $200,000 per displaced worker, amounting to about $30 million in the first year of the program and rising subsequently, as the cumulative number of displaced workers rises.
4. An additional 5,500 workers per year will also face displacement due to the approximately 50 percent contraction of the oil and gas industry between 2021 – 2030. These are workers who are connected to the oil and gas industry through the industry's supply chain (indirect job losses) or through the general impact of the oil and gas industry on California's overall economy (induced job losses). These workers will have available to

them the enhanced levels of health insurance and unemployment insurance that we have discussed above and that should apply to all workers in California. They will also benefit through the major expansion of job opportunities generated by clean energy investments in the state.

Another area that needs to be included in Just Transition discussions is reinvestment and general support for communities that are, at present, heavily dependent on the fossil fuel industry. These communities will face formidable challenges adapting to the fossil fuel industry's decline. One obvious set of projects would be to clean up and reclaim the oil and gas production sites. Another is to repurpose land. This is the reason why I have included plugging orphaned oil wells as a major project within the area of clean energy investments. However, more generally within this study, I am not able to explore the critical issues of community-based Just Transition policies in detail.[34]

5. Upgrading California's Public Infrastructure

California's economy would receive a major boost, both in terms of short-run stimulus and longer-term productivity, by undertaking a large-scale public infrastructure investment program now. This becomes clear from considering the findings of the American Society of Civil Engineers (ASCE) in its 2019 assessment on California's infrastructure. The ASCE gave California's infrastructure an overall grade of C- as of 2019. The ASCE's analysis identifies major problems in all areas of California's infrastructure. The grades the ASCE has assigned to individual areas of infrastructure range between D and C+. I show the ASCE's individual sectoral assessments in Table 6.

The ASCE also evaluated the quality of the public infrastructure for the U.S. overall in 2019, awarding the U.S. infrastructure an overall grade of D+. Their assessment for California is therefore modestly more favorable—or more precisely, modestly less unfavorable—than that for the country overall. The ASCE also estimated that the overall costs of bringing the overall U.S. infrastructure to a B level of quality would require about $2 trillion in investment spending over a decade, or about $200 billion per year for 10 years.

California accounts for 14.5 percent of U.S. GDP. As such, the state's share of the ASCE's overall U.S. investment program would amount to about $28 billion if funding were

TABLE 6
American Society of Civil Engineers Grades of Individual Sectors of California's Public Infrastructure
Grades are for 2019

Aviation	C+
Bridges	C-
Dams	C-
Drinking water	C
Energy	D-
Hazardous waste	C-
Inland waterways	D
Levees	D
Ports	C+
Public parks	D+
Rail	C
Roads	D
School	C
Solid waste	C-
Stormwater	D+
Transit	C-
Wastewater	C+

Source: : https://www.infrastructurereportcard.org/state-item/california/.

allocated on the basis of each state's relative GDP levels. However, because the ASCE assesses California's infrastructure quality level as being modestly better than the U.S. overall, I am assuming that the annual budget requirements for upgrading to a B level of infrastructure quality in California will be $25 billion.

In terms of allocating the annual $25 billion investment budget into the individual infrastructure sectors, I mainly follow the proportions set out by the BlueGreen Alliance in its 2017 study, *Making the Grade 2.0*. I then make some small adjustments to the BlueGreen Alliance spending proportions to incorporate three additional infrastructure investment areas, these being: 1) expanding broadband access, in support of achieving universal broadband access throughout California; 2) fixing leaking gas pipes; and 3) increasing the supply of affordable public housing.[35]

TABLE 7
Job Creation in California Through $25 Billion/Year Public Infrastructure Investment Program

	Job Creation per $1 Million in Spending				2021 Job Creation at $25 Billion in Spending	
	1. Direct Jobs	2. Indirect Jobs	3. Induced Jobs	4. Total Job Creation *(= columns 1+2+ 3)*	5. Budget per Investment Area	6. Job Creation per Year *(= columns 4 x 5)*
Surface transportation	10.4	1.9	2.8	15.1	$11.0 billion	166,100
Water/wastewater	5.3	2.1	3.0	10.4	$1.0 billion	10,400
Electricity	3.0	1.6	2.1	6.7	$2.0 billion	13,400
Airports	3.3	1.4	2.1	6.8	$420 million	2,856
Inland waterways/ marine ports	3.8	2.5	2.5	8.8	$150 million	1,320
Dams	7.4	2.4	3.7	13.5	$400 million	5,400
Hazardous and solid waste	6.5	2.2	2.9	11.6	$30 million	348
Levees	7.4	2.4	3.8	13.6	$700 million	9,520
Public parks and recreation	11.0	2.3	3.7	17.0	$1.0 billion	17,000
Rail	3.2	2.2	2.4	7.8	$300 million	2,340
Schools	10.8	1.4	3.7	15.9	$3.5 billion	55,650
Gas distribution pipelines—leak repairs only	1.2	1.7	1.7	4.6	$1.5 billion	6,900
Broadband	2.3	2.3	2.1	6.7	$2.0 billion	13,400
Public housing	6.2	1.7	2.8	10.6	$1 billion	10,600
TOTALS	---	---	---	---	**$25 billion**	**315,234**

Sources: IMPLAN Input/output California Dataset.

In Table 7, I present estimates as to the level of job creation that would result through $25 billion in public infrastructure investments in the areas listed, and at the funding levels presented. As with the figures on clean energy investments, we report figures for direct, indirect and induced jobs generated by the infrastructure investments, as well as the total figures for job creation, for each sector as well as for the overall $25 billion annual project.

As Table 7 shows, overall, I estimate that $25 billion in annual infrastructure investments in California will generate about 315,000 jobs within the state. As with the clean energy jobs, some of these projects cannot be expected to be undertaken immediately—i.e. they are not "shovel-ready" projects capable of providing a short-term boost to counteract the present slump. At the same time, some of the infrastructure investments are shovel ready or close to being so. These include road and bridge repairs; maintenance and repair work at airports, schools, water and gas distribution pipelines; and overall spending on parks and recreation.

As with the clean energy investment projects, creating tens of thousands of new jobs in these areas with shovel-ready projects can serve as the initial phase of a longer-term infrastructure investment program that will help California establish a durable economic recovery. Overall, some of the areas in which the full-scale set of infrastructure investments will generate substantial new employment opportunities include the following:

- *Surface transportation:* construction equipment operators, cement masons, paving equipment operators, carpenters, construction laborers.
- *Water/wastewater:* maintenance and repair workers, treatment plant and system operators, meter readers, construction managers.
- *Electricity:* electricians, electric power-line installers and repairers, electrical assemblers, construction laborers.

In addition, as with the clean energy investment projects, the public infrastructure projects will generate major new employment opportunities for, among others, secretaries, office managers, customer service representatives, and accountants.

6. Just Transition for All Impacted Workers

In addition to the oil and gas industry, a substantial share of jobs in hard-hit service industries such as restaurants, hotels and retail are likely to not return in the aftermath of the recession. The extent to which these industries will contract their employment levels over the longer term is now a matter of uncertainty, and will remain so for some time. Nevertheless, some economists and forecasters have begun to generate projections. Credible estimates of the extent of permanent job contraction in industries such as on-site retail, restaurants, and hotels are as high as 25 percent.[36]

For our purposes here, the critical point to emphasize is that workers in these industries also need Just Transition support, comparable to that provided for workers who are going to be impacted by the phase-out of California's oil and gas industry. This support would include pension guarantees, Medicare health insurance coverage while unemployed, wage insurance, and high-road job training and placement support.

The California Workforce Board has created a valuable model for broadly-targeted Just Transition policies in the state. These are what the Board terms "High Road Training Partnerships" whose purpose is to create high-quality job opportunities throughout the state within a framework of "equity, sustainability, and job quality."[37] The training partnerships focus explicitly on creating greater equity, which it defines to mean "systematically generating greater opportunity for those who have been too long excluded." The Training Partnerships also prioritizes high road employers in the state. It defines high road employers as those that "pay family supporting wages, compete based on the quality of their services and products, and engage workers and their representatives in the project of building skills and competitiveness. In this, we consistently seek to engage industry leaders — employers and, wherever possible, unions – in the project of developing skill solutions to shared industry problems."[38]

These issues of a more broadly-targeted set of Just Transition initiatives in California is an issue which I consider in depth in forthcoming work.

7. Financing a Sustainable Recovery

The California state budget, like all state and municipal-level budgets, faces a severe crisis resulting from the pandemic and recession. Thus, in January, Governor Newsom had proposed a 2020 – 2021 state budget of $222.2 billion, a 3.4 percent increase from the actual 2019-20 budget of $214.8 billion. However, in his May 14 revision, Newsom proposed a budget at $203.0 billion, an 8 percent reduction relative to the January proposal and a 6 percent cut relative to the actual 2019-20 state spending level.

The big cuts in Newsom's May proposal are in education, in both percentages and total dollar amounts. They include a massive 20 percent reduction in K – 12th Grade spending, from $61.6 to $49.3 billion, along with a 10 percent cut in Higher Education, from $18.1 to $16.3 billion.[39] Governor Newsom's May revision also includes no additional state funding for Health and Human Services. Rather, this share of the state budget would remain at the governor's proposed level of $71.2 billion as of January, despite the huge increase in demand for public health interventions resulting from the pandemic. Even with the proposed austerity budget under Governor Newsom's May revisions, the state would still face a projected deficit of $21 billion, with total revenues coming from both general and special funds amounting to $181.9 billion.[40]

Two reports from the state's Legislative Analyst's Office (LAO)—from 5/8/20 and 5/19/20—present a somewhat less dire budgetary picture.[41] But the LAO does also recognize that the depth of the state's budgetary problem will depend on the severity of the recession itself, and that the severity of the recession remains as an unknown. The 5/8/20 LAO report summarizes the situation as follows:

> Although much is unclear about the economy, we can be fairly confident that the state currently is in a deep recession. The budgetary impact of that recession will depend on its depth and duration, which are difficult to anticipate. In light of this uncertainty, our outlook presents two potential scenarios: 1) a somewhat optimistic "U-shaped" recession, and 2) a somewhat pessimistic "L-shaped" recession. These scenarios do not depict the best or worst case. Outcomes beyond the range of our scenarios—especially worse than what we show—are entirely possible….The state's newly emergent fiscal challenges are unlikely to dissipate quickly and will extend well beyond the end of the public health crisis. Under both of our economic scenarios, budget deficits persist until at least 2023 – 2024 (p. 1).

The general point that emerges clearly both from the governor's proposals and the LAO reports is that California's state government is facing deep cuts in its spending programs in 2020-2021, and almost certainly beyond as well. These cuts will, in turn, contribute to deepening and lengthening the state's recession. As against this austerity scenario, what is instead needed at present is for the state to *increase* its level of public spending. This will enable the state to strengthen its public health interventions, to scale up its climate stabilization project and to upgrade its public infrastructure. Increased public spending in these areas will also serve as a necessary counterforce against the sharp decline in private sector spending, and thereby serve effectively as the main driver of a statewide anti-austerity program.

This same point also applies to California's municipalities. As of the 2017-18 figures, the most recent publicly available comprehensive data, the overall budgets for all California

local government activities was $244 billion. This includes the budgets for the state's cities, counties, special districts and transit operators.[42] According to an estimate by the economist Timothy Bartik of the Upjohn Institute, revenue shortfalls for local governments throughout the U.S. will be in the range of $200 billion through until March 2021.[43] If we assume that the California municipalities share of this projected shortfall is equivalent to the state's share of U.S. GDP, that would imply a municipal government shortfall of around $30 billion for California over the next year—i.e. about 12 percent of the $244 billion combined 2017 – 18 budgets.

Considering these situations with the public sector budgets in California, at both the levels of state government and municipalities, it is imperative that the public entities at all levels undertake serious consideration of some non-conventional financing approaches along with obtaining increased support from the federal government.

Federal Government Support

In the CARES Act and related measures, the federal government did provide large-scale support to states and municipal governments through various specific channels. The LAO provided estimates of the funding that has flowed into California through these measures.[44] I summarize their main findings in Table 8 below.

As we see, the funding support going to the state government was $26.6 billion, equal to about 0.9 percent of the state's 2019 GDP. In addition, $7.7 billion was provided for local governments and an additional $8.1 billion to other public entities in California. These figures total to $42.2 billion, equal to about 1.4 percent of California's GDP.

TABLE 8
Federal COVID-19 Related Funding to California

	Funding Level	Funding as Share of California 2019 GDP
Assistance to Public Entitles		
Funding to state government	$26.6 billion	0.9%
Funding to local governments	$7.7 billion	0.2%
Funding to other public entities	$8.1 billion	0.3%
Total assistance to public entities	**$42.4 billion**	**1.4%**
Assistance to Individuals		
Unemployment insurance benefits for all standard employees	$20 billion	0.6%
Unemployment insurance benefits for freelancers, self-employed and gig workers	$5 – 10 billion	0.2 – 0.3%
Cash assistance	$25 – $30 billion	0.8 – 1.0%
Total assistance to individuals	**$50 – $60 billion**	**1.6 – 1.9%**
TOTAL ASSISTANCE	**$92.4 – 102.4 billion**	**3.0 – 3.3% of GDP**

Source: https://lao.ca.gov/Publications/Report/4226.

Additional funding was provided through the CARES Act to individuals in California, both through the expansion of unemployment insurance as well as through direct cash assistance distributions. The LAO report provides what they term as rough estimates of the support provided through these programs to individuals in California. As we can see, the LAO estimates these amounts at between $25 – 30 billion in supplemental unemployment insurance and $30 billion in cash assistance. This totals to about $68 billion in support for individuals.

The federal government's level of support thus totals to between $92 – $102 billion through all programs within the CARES ACT, with $42 billion going to state and local government entities, and between $50 – $60 billion going to individuals through unemployment insurance and direct cash assistance. This is certainly a large-scale injection of funds. As we see in Table 8, overall, it amounts to about 3 percent of California's GDP for 2019.

At the same time, this level of support is tiny in comparison with the decline in the state's GDP and rise in unemployment since March. As we have discussed above, California's GDP fell by 1.2 percent from January – March. The estimate from the UCLA Anderson School is that, over the second quarter, between April – June, state GDP will likely fall by an additional 10 – 12.5 percent. Within these circumstances, the LAO has projected that state-level revenues will fall by between 16 – 21 percent over 2021.[45]

This is the context in which the U.S. House of Representatives passed the HEROES Act on May 15. This measure would provide additional funding support for California and other states. Estimates as to how much California is slated to receive range between about $50 billion – $73 billion in support.[46] However, even this amount of funding is not likely to be sufficient to move California onto a viable recovery path. It is also far from certain that the HEROES Act is going to pass the Senate in its present form and be signed by President Trump.

State-Level Funding Prospects

Given this situation, California needs to develop its own contingency plans for alternative funding to support a strong recovery. In considering this, it is critical to recognize that, by statute, the state does have the legal authority as well as the capacity to issue bonds to support capital projects.[47] Such capital projects could, for example, be in the areas of traditional infrastructure such as roads or school buildings. Capital projects could also include public-sector led clean energy investments to, for example, raise energy efficiency standards in public buildings through retrofitting projects. In fact, between the fiscal years 2000 – 2001 and 2019 – 2020, the California state budget did run deficits of varying amounts in 13 of the 19 years.[48]

In addition, the state can expand the range of investment projects that can be financed through borrowing, by issuing "human capital" bonds, to cover expenditures on health and education. Focusing on state-level funding in the area of educational financing, the University of Massachusetts Amherst economist Gerald Epstein (2020) has developed a proposal in detail as to how "human capital bonds" could be introduced.[49] Epstein writes:

> Most states' balanced budget requirements only apply to the budgets for current spending. These states have separate capital budgets for longer-term investments, such as in new schools, new buildings on college campuses, new roads, etc., that are designed for borrowing. So, one way

> around the balanced budget problem is to identify this emergency education spending as a type of capital spending and put it under the capital budget. This would entail denoting the borrowing instruments as investments in *human capital*, using parlance long established in the economics profession. The bonds could be called, for example, *human capital bonds* and they could be issued under states' capital budgets (2020, p. 3).

As Epstein (2020) further explains, the Federal Reserve currently operates a program to purchase bonds from state and municipal governments, what the Fed has termed its "Municipal Liquidity Facility." Under its current operating procedures, the Fed has the capacity under this facility to purchase up to a total of $500 billion in state and municipal bonds.[50] Under this program, the state government and municipalities in California should be able to sell in the range of $75 billion in bonds to the Fed—i.e. about 15 percent of capacity of this specific facility, equal to California's share of U.S. GDP. If the Fed's bond purchasing capacity were to increase in response to the ongoing severe recession, California's ability to increase its borrowing through this program can then rise correspondingly.

What Are California's Funding Needs?

As we have discussed, there is a great deal of uncertainty regarding the trajectory of the California economy over the next year. This is equally true for the U.S. and global economies. It is therefore not possible to know what funding amounts would be sufficient to move California onto a viable recovery path. Broadly speaking, we do nevertheless know that large-scale funding will be needed, at the least, to support short-term interventions in the areas of public health, unemployment insurance, and cash assistance, as well as longer-term investment projects in health and education, clean energy, and public infrastructure.

In Table 9, I provide some rough estimates of funding requirements over both the very short-term of the next three months as well as within a longer-term framework of the first year of multi-year projects. The budget amounts listed in Table 9 are all based on the various financing considerations that I have presented in previous sections.

Thus, starting with the 3-month time period, Table 9 first lists supplemental unemployment insurance and cash assistance support, at $25 billion each. These figures basically match the LAO's estimate of the support individual Californians have received thus far through the CARES Act. These CARES Act programs have already distributed their funding allocations or will be ending soon.[51] The budgetary allocations I have provided for these programs, at $25 billion each, would extend these programs at their CARES Act level of support for another three months.

The $15 billion allocated for the Medicare Crisis program, as listed in Table 9, would also be over a 3-month period. This figure is based on the estimate my co-authors and I generated of the overall funding level for this proposed program on a national basis. Our estimate of the overall funding requirements for this program is $106 billion, assuming that, on average over the next three months, 30 million people are unemployed in the U.S.[52] The corresponding California unemployment figure would then be about 4.5 million people.

Moving into the longer-term budgetary allocations listed in Table 9, the $14 billion for supplemental public health/safety interventions represents a 20 percent increase in the state's Health and Human Services funding over the $71 billion included in Governor Newsom's May 14 revised budget. I roughly estimate this as being the amount of additional financial

TABLE 9
Proposed Budgets for California Public Health, Short-Term Stimulus, and Long-Term Investment and Recovery Programs

	Budget Level	Time Frame for Spending
State Government Support		
Supplemental unemployment insurance	$25 billion	3 months—reassess in September
Cash assistance	$25 billion	3 months—reassess in September
Medicare crisis health insurance	$15 billion	3 months—reassess in September
Supplemental public health/safety interventions	$14 billion	1 year
Maintain full funding for public education, all levels	$14 billion	1 year
Clean energy investments—public funds	$20 billion	1 year
Public infrastructure investments	$25 billion	1 year
Total state-level support	$138 billion	Combined 3 months and 1 year
Municipal Government Support	**$30 billion**	**1 year**
TOTAL STATE PLUS MUNICIPAL GOVERNMENT SUPPORT	**$168 billion**	**Combined 3 months and 1 year**

Source: Funding levels described in text.

support necessary in California over the next year to provide adequate public health interventions to control the COVID pandemic at a level roughly equivalent to countries such as Japan or Australia. As we have reviewed in Section 1, management of the pandemic in Japan, Australia and elsewhere has been dramatically more effective than those in California or the U.S. generally.

These public health investments will also generate major increases in employment for health care workers. As we saw in Table 2, nearly 20 percent of California's health care workers experienced job loss between March 15 and May 9. This is at precisely the time at which the state was focused intensively on controlling the spread and mitigate the impact of COVID-19. Jobs in public health need to be restored and expanded in California to sustain a safe reopening of the economy.

The $14 billion listed for state-level public education support is the amount that would be necessary to close the funding gaps for all public education spending presented in Governor Newsom's May 14 revised budget. This is the support level needed to prevent job losses for the more than 300,000 public school teachers throughout the state, as well as other workers in the public school sector, including guidance counselors, building maintenance technicians, and custodians.

The $20 billion in public funding for clean energy investments and $25 billion for public infrastructure projects are the amounts that I derived in the discussions on these respective programs, in Sections 4 and 5 above.

Finally, Table 9 includes $30 billion in overall support for municipal entities throughout the state. This is the figure I presented earlier in this section, based on the projection by Timothy Bartik on municipal-government revenue losses over the coming 12 months.

As we see, adding everything up, I estimate the total level of additional public funding needs for California as being $168 billion. This is equal to about 5.4 percent of California's 2019 GDP. It is obviously a large sum. But, by contrast, the CARES Act was funded at $2 trillion, roughly 10 percent of overall U.S. GDP. The U.S. House version of the HEROES Act which passed the U.S. House of Representatives in May would be funded at $3 trillion, or about 14 percent of U.S. GDP. In addition, interventions undertaken by the Federal Reserve during the COVID crisis, through bond purchases to both private and public entities, including state and municipal governments, as well as direct loans to private businesses and Wall Street firms, are projected to reach between $5 and $8 trillion, or up to 40 percent of U.S. GDP.[53]

Where to Find the Funds?

The most appropriate source of funds to meet these budgetary needs for California would be the U.S. federal government, both through borrowing by the U.S. Treasury and financial injections by the Federal Reserve. It is now well understood that, unlike any other government or private entity in the world, the U.S. government has the capacity to borrow at will over the course of the recession. This is, first of all, because U.S. government bonds are recognized as the safest assets available on the global financial market. Demand for these bonds has therefore surged during the recession. As a result, the interest rate on U.S. Treasury Bonds with a five-year maturity is 0.34 percent as of 6/4/20, with no hint of any upward movement forthcoming. When the U.S. government can borrow at 0.34 percent, the burden of paying interest on the debt will also be modest, even if the amounts being borrowed are gigantic.

Still further, if the federal government's debt-servicing burden should ever become excessive, the Federal Reserve has the capacity, as needed, to buy up and effectively retire a share of this outstanding debt. The technical term for this policy measure is "debt monetization." Through practicing debt monetization, the U.S. government can, in fact, effectively create money as needed in order to counteract the economic crisis (without having to literally run a printing press). As discussed above, the Fed can also buy up both corporate bonds as well as, most critical for our purposes, state and local government bonds.[54]

At the same time, California cannot proceed with addressing its current budgetary crisis based on an assumption that the federal government and Federal Reserve will supply upwards of $170 billion in funding support. Identifying workable contingency plans is therefore a pressing need.

One possible scenario could include the following features: 1) A final version of the federal HEROES Act provides $50 billion in support for California. This would be in the low end of current estimates of what the HEROES Act might provide, if a version became law that was similar to what passed in the House of Representatives; and 2) The Federal Reserve purchases $60 billion in California government bonds.

These two acts would lower the remaining California government borrowing requirement to about $60 billion. This will enable the California state and municipal governments to borrow at extremely low interest rates. As it is, bonds issued by the state and municipalities in California are already being marketed at very low interest rates. As of 6/3/20, the average rate on one-year California municipal bonds was 0.57 percent and the average rate on 10-year bonds was 1.66 percent. These rates should fall lower still to the extent that the Federal Reserve engages in an active program to purchase these bonds.

Endnotes

1 https://www.latimes.com/california/story/2020-04-17/california-health care-workers-hospitals-coronavirus-pandemic.

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7 https://covid19.ca.gov/roadmap/.

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20 https://www.sanders.senate.gov/newsroom/press-releases/sanders-jayapal-unveil-emergency-legislation-to-provide-health-care-for-all-during-pandemic-.

21 https://www.jdsupra.com/legalnews/california-enacts-new-supplemental-paid-36036/.

22 https://www.jdsupra.com/legalnews/bay-bridge-series-oakland-enacts-covid-72375/.

23 https://www.theguardian.com/technology/2020/may/07/amazon-warehouse-workers-coronavirus-time-off-california.

24 In addition to strengthening paid sick leave provisions throughout California, the state should also strengthen its support for paid "safe leave," for workers in the state. Safe leave provisions in California allow workers to take job-protected time off to attend to their needs if they, or an immediate family member in some cases, are the victim of domestic violence. The incidence of domestic violence has increased in the U.S. and elsewhere as a result of the COVID lockdown conditions. For Califonia's safe leave provisions, see: https://www.shouselaw.com/employment/leave-laws.html#:~:text=Eligible%20employees%20in%20California%20can,more%20weeks%20of%20leave%20available. On rising domestic violence incidence, see: https://www.nytimes.com/2020/05/15/us/domestic-violence-coronavirus.html.

25 https://www.ipcc.ch/sr15/chapter/spm/.

26 Senate Bill 32, in conjunction with AB-197, passed in 2016, and was meant to expand upon AB-32 passed in 2006.

27 https://www.vox.com/energy-and-environment/2018/9/11/17844896/california-jerry-brown-carbon-neutral-2045-climate-change.

28 I focus here on CO_2 emissions, which account for over 80 percent of all greenhouse gas emissions in the state. CO_2 emissions in California as of the most recent 2017 figures are, moreover, virtually identical to those for 1990 (i.e. 368 million tons in 1990 vs. 361 million tons in 2017). For a derivation as to how my co-workers and I have calculated the relationship between clean energy investment and emissions reduction levels, see, for example, https://www.peri.umass.edu/publication/item/1032-green-new-deal-for-u-s-states.

29 Busch et al. (2016), "The California Climate and Clean Energy Policy Story," provides a brief overview of these initiatives: https://energyinnovation.org/wp-content/uploads/2016/11/CA_LowCarbonStory.pdf. See Pollin et al. (2017) for a discussion on leveraging public funds through policy regulations and incentives to induce private investments at the state level, in this case, in New York State, https://www.peri.umass.edu/publication/item/1026-clean-energy-investments-for-new-york-state-an-economic-framework-for-promoting-climate-stabilization-and-expanding-good-job-opportunities.

30 Projects to safely plug orphaned oil wells represents a significant source of job creation in activities that are closely aligned with the jobs now performed by oil and gas industry field workers. A recent study by the Center for American Progress estimates that between 12,000 – 24,000 jobs could be generated throughout the U.S. to work on plugging a significant share of the hundreds of thousands of wells that are already orphaned or are about to become orphaned: https://www.americanprogress.org/issues/green/reports/2020/04/29/484158/congress-can-help-energy-states-weather-oil-bust-coronavirus-pandemic/.

31 Details on these figures are on pp. 38 – 39 of: https://www.peri.umass.edu/publication/item/1168-a-green-growth-program-for-colorado#:~:text=The%20program%20is%20specifically%20designed,annual%20rate%20of%202.4%20percent.

32 https://www.constructiondive.com/news/bay-area-construction-opens-to-new-set-of-rules-and-guidance/577479/; https://www.latimes.com/california/story/2020-05-07/gavin-newsom-businesses-reopen-california-second-coronavirus-phase-details; https://www.sfchronicle.com/business/article/Bay-Area-construction-to-restart-with-new-15235261.php.

33 It is also the case that the oil and gas industry, in California, throughout the U.S. and globally, is experiencing a severe crisis at present unrelated to climate change issues. The current crisis has resulted from the collapse of demand resulting from the pandemic and recession, and even before this, in early 2020, an oil price war between Russia and Saudi Arabia. Thus, the global price of oil fell by more than 50 percent in early 2020, before the onset of the pandemic. As a result of these developments, a report on March 26 by the Federal Reserve Bank of Dallas presents a "bleak outlook for the oil industry" over the near future, stating that "industry layoffs and bankruptcies and lower U.S. crude oil production seem inevitable." (https://www.dallasfed.org/research/economics/2020/0326). As such, workers in California's oil and gas industry, as well ancillary industries, would be facing difficult circumstances in the foreseeable future independent of the measures being implemented in California and elsewhere to transition out of fossil fuels as an energy source.

34 My co-authors and I have discussed these issues in depth in state-level clean energy investment studies for New York, Washington, and Colorado. See: https://www.peri.umass.edu/publication/item/1032-green-new-deal-for-u-s-states.

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