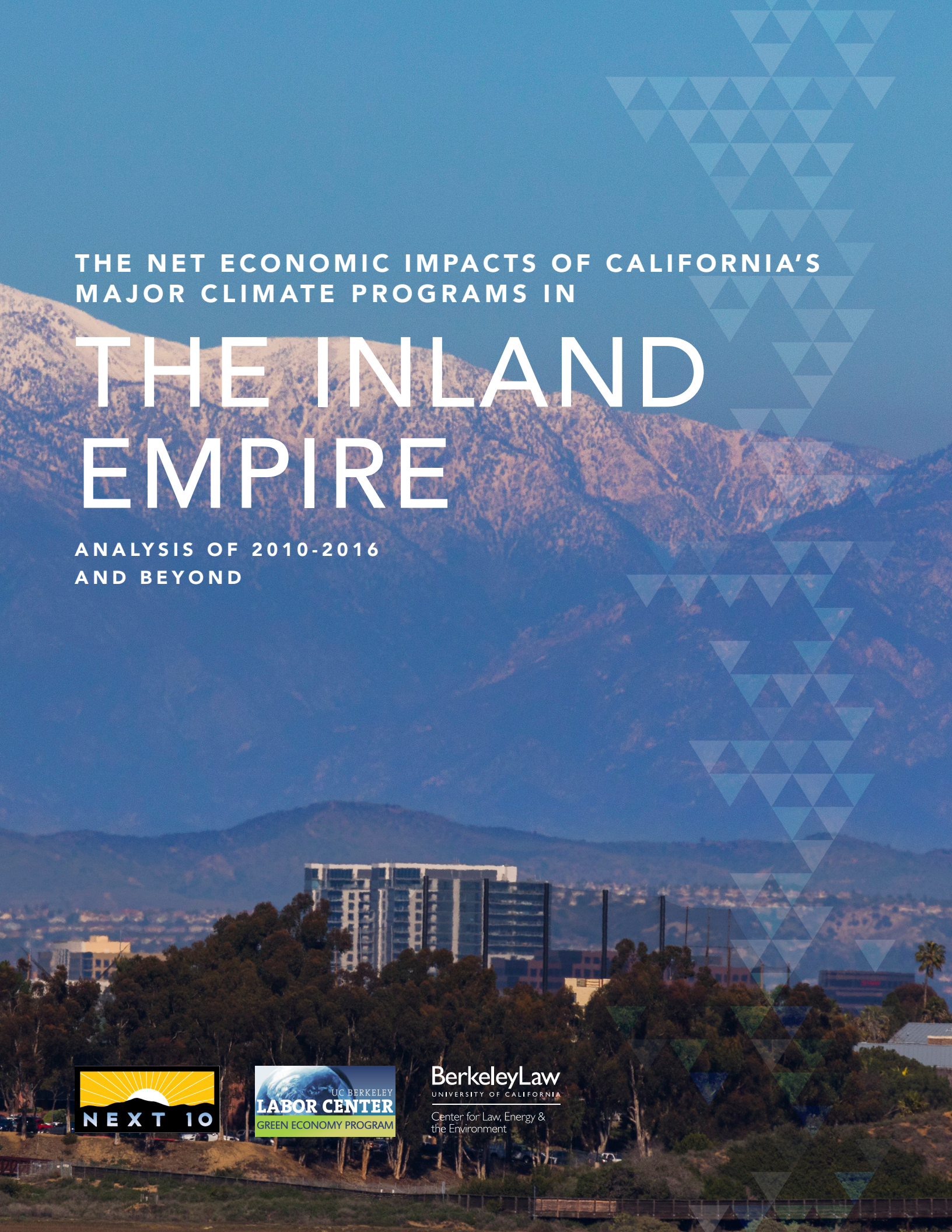

THE NET ECONOMIC IMPACTS OF CALIFORNIA'S MAJOR CLIMATE PROGRAMS IN

THE INLAND EMPIRE

ANALYSIS OF 2010-2016 AND BEYOND

NEXT 10

UC BERKELEY LABOR CENTER
GREEN ECONOMY PROGRAM

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EXECUTIVE SUMMARY

As the metropolis of Los Angeles spread east and Southern California industry shifted after World War II from manufacturing war supplies to a consumer economy, the sweeping groves of the Orange Empire gave way to the sprawling housing developments of the Inland Empire. Located in the valleys and foothills east of Los Angeles and north of San Diego, the Inland Empire is defined here as Riverside and San Bernardino Counties. Situated in a strategically important area inland from the ports of Long Beach and Los Angeles, the Inland Empire has been a hub for the transportation of goods and people since its initial development. After the economic downturn of 2008-09, the region emerged as a powerhouse in the blossoming logistics and warehousing industry;[1] transportation and warehousing employ 7 percent of the region's workers (compared with 5 percent statewide).[2] In addition, the Inland Empire has always included many "bedroom communities" for the Los Angeles area: about 44 percent of Inland Empire workers travel 30 or more minutes each way to work.[3]

But this economic shift has come with an environmental cost. Industrial air pollution has directly affected the lives of Inland Empire residents since World War II, when a steel plant was built in the San Bernardino County town of Fontana. The air quality challenges have become more pressing with the growth in automobile traffic in the Los Angeles area, as prevailing winds bring smog into the region.[4] The Empire's valleys also trap the area's own air pollution from the truck, automobile, and train traffic running through the region, connecting the ports to the west with the major throughways to the east.[5]

In addition to the environment, the economy of the region is also fragile. The Inland Empire makes up over 11 percent of California's population,[6] but incomes and employment lag behind much of the state. Per capita income is about $23,000 compared with a state average of over $30,000, placing it among the lowest earning metropolitan areas in California. More than 17.5 percent of the population was living below the federal poverty line in 2015 ($24,250 for a family of four), compared to 14.7 percent of California's entire population.[7] The environmental and economic challenges facing the Inland Empire make it an important region in which to study the economic impacts of the state's climate programs.

This report offers a quantitative assessment of the net economic impacts between 2010 and 2016 in the Inland Empire of four of California's major climate programs and policies: cap and trade, the renewables portfolio standard (RPS), distributed solar programs (including the California Solar Initiative), and investor-owned utility (IOU) ratepayer-funded energy efficiency programs, overseen by the California Public Utilities Commission (CPUC). It also includes projections and factors affecting the impacts of these programs on the region through 2030.

Results for the four programs and policies investigated are summarized below. The findings indicate that California's major climate policies have had net economic benefits in the Inland Empire.

Economic Impacts

This analysis presents costs and benefits to the Inland Empire economy—including job gain and loss—of cap and trade, the RPS, distributed solar programs, and energy efficiency programs overseen by the CPUC. We used publicly available data to determine the costs and benefits of these programs between 2010–16, and then modeled the regional economic impacts using IMPLAN.

After accounting for the full costs of these programs to industry, the region received $9.1 billion more than was spent, and saw 41,000 more jobs gained than were lost. When accounting for the ripple effects of this influx of capital (the secondary and tertiary spending that occurs), the Inland Empire saw a total of $14.2 billion in economic activity and 73,000 jobs as a results of California's major climate programs. Over 90 percent of the direct impact is due to the proliferation of renewable energy power plants in the region.

While the benefits of California's expanding green economy have been widely reported,[9] this analysis provides a more tempered account by also considering the suite of costs resulting from environmental policy.

For cap and trade, we quantified the cost to the Inland Empire's capped entities of complying with the program. These entities included transportation fuel suppliers, mining operations, and other emission-intensive industries. These estimated compliance costs were based on each entity's reported emissions, minus estimated free allowances, times the settlement price of greenhouse gas allowances auctioned by the California Air Resources Board. We quantified the benefits going to the region from the Greenhouse Gas Reduction Fund (GGRF), which is created with auction proceeds. We adjusted these benefits downward by accounting for the share of these investments in the region that "leak out" of the economy. For example, "leakage" occurs when Greenhouse Gas Reduction Fund investments are spent on locomotives

manufactured outside of the region. Even after weighing the costs and tempering the benefits, the cap-and-trade program has had a net positive impact in the region, meaning that the impact of the money flowing into the region from the investment of auction revenue via GGRF dollars exceeds the impact of money flowing out of the region for allowance purchases.

For the renewables portfolio standard (RPS), which requires that an increasing share of the state's electricity sales must be from renewable sources, we gathered information on all new power plants built in the region since 2010. We then omitted the construction of renewable energy facilities that may have been built to replace older natural gas plants that retired between 2010 and 2016. We reasoned that replacement infrastructure would have been built anyway, and we sought to measure only net impacts attributable to the RPS. We also accounted for the negative impacts of fossil fuel-based electricity generation reductions caused by the increase in renewable generation. The RPS has had a resulting significant net positive impact in the region. The Inland Empire is still a net importer of electricity, but less so due to the region's strong competitive advantage for wind and solar.

For distributed solar and energy efficiency, we gathered the ratepayer and federal incentives to customers in the Inland Empire to catalyze solar and efficiency investments. We did not account for the additional private spending associated with solar installation and energy efficiency. In addition to the public incentives, we accounted for the costs incurred by ratepayers in funding these climate programs. These costs and benefits are shown by line in Table 1 and described in the report with details on our data sources and methodology.

MOST AFFECTED INDUSTRIES

The impacts reported by IMPLAN (summarized in Table 1) can be used to identify local industries that benefit from and are harmed by the state's climate programs (See Table 2). These results indicate that the Inland Empire's building industry benefitted the most from the programs over the 2010 to 2016 period. The segments of this industry most impacted were involved in the construction of solar and wind electric power facilities as well as residential and non-residential solar. Construction establishments experienced an increase of over $9.6 billion in additional business and the addition of over 36,000 jobs. This activity added much needed stimulus to an industry that had not fully recovered from the 2008-2009 Great Recession.

Another positively impacted industry resulted from the operation of new wind and solar power generation facilities. Revenue for these operators increased by over $1.8 billion and increased employment by over 900 jobs. Third, the ripple effects associated with jobs, income, and spending increased revenue for local retailers by over $760 million and increased employment by approximately 9,000 jobs.[9] Fourth, wholesale establishments experienced a revenue increase of over $330 million and an employment increase of over 1,500 jobs. Finally, the increase in economic activity stimulated real estate activity. Sales revenue for real estate establishments increased by about $243 million with the addition of over 1,600 jobs. These top five most impacted industries experienced about 91 percent of the total economic impact and approximately 67 percent of the total employment impact.

TABLE 1 Economic Impacts (Costs and Benefits) of California's Major Climate Programs in the Inland Empire, 2010-16 (reported in 2017 dollars)

Climate Program	Impact	Direct Effects	Direct Employment	Total Impact on Economic Activity	Total Impact on Employment	Impact on State & Local Tax Revenue
		($ million)	(jobs)	($ million)	(jobs)	($ million)
Cap and Trade	Cap-and-Trade Auction Proceeds (Greenhouse Gas Reduction Fund (GGRF) Implemented)	$95	240	$58	409	$2.4
	Cap-and-Trade Compliance (Material Purchases)	-$25		-$15	-117	-$0.7
	Cap-and-Trade Compliance (Labor & Proprietor Compensation)	-$29		-$17	-138	-$0.8
Renewable Energy	Renewable Energy Construction	$8,367	29,255	$12,088	58,498	$360.1
	Increased Grid-Scale Wind Generation	$587	265	$809	2,046	$29.8
	Increased Grid-Scale Solar Generation	$1,307	669	$1,592	2,967	$36.4
	Reduced Natural Gas Generation	-$1,968	-1,167	-$2,021	-3,299	-$175.4
Distributed Solar and Energy Efficiency	Distributed Solar (Federal Tax Credit)	$893	4,836	$1,220	8,195	$40.7
	Distributed Solar (California Solar Initiative)	$210	1,134	$286	1,922	$9.6
	Energy Efficiency Installation Activity	$365	2,080	$489	3,292	$16.1
	Energy Efficiency Program Administration	$247	3,972	$357	4,643	$13.5
	Ratepayer Costs-Household Income	-$749		-$450	-3,568	-$21.7
	Ratepayer Costs-Supplier Industries	-$121		-$142	-1,441	-$4.6
	Ratepayer Costs-Proprietor Income	-$24		-$14	-113	-$0.7
	Net Impact	**$9,155**	**41,284**	**$14,240**	**73,296**	**$304.7**
Net Impact	**Average Annual Impact (2010-16)**	**$1,307.9**	**5,898**	**$2,034.3**	**10,507**	**$43.5**

*Note: Impact on economic activity includes direct effects and impact on employment includes direct jobs.

TABLE 2 Top Five Inland Empire Industries Benefiting From and Harmed by California's Major Climate Programs. Industry-Level Impacts for Industry-Level Revenue and Employment, 2000-16

Top Five Industries Benefitting from Programs	Revenue and Employment	Top Five Industries Harmed by Programs	Revenue and Employment
Construction	$9,690.3 million 36,536 jobs	Electric Power Generation with Fossil	–$1,724.4 million -1,165 jobs
Renewable Power Generation (wind and solar)	$1,894.1 million 934 jobs	Extraction of Natural Gas and Crude Oil	–$11.3 million –36 jobs
Retail	$762.6 million 8,917 jobs	Mining	–$3.6 million –7 jobs
Wholesale Trade	$338.4 million 1,551 jobs	Support Industries for Oil and Gas Operations	–$38,300 –less than 1 job
Real Estate	$242.8 million 1,625 jobs	Drilling Oil and Gas Wells	–$1,000 –less than 1 job
Total	**$12,928.2 million 49,563 jobs**		**–$1,739.3 million –1,210 jobs**

Source: IMPLAN. Results reported in 2017 dollars.

The industries most negatively affected were involved in fossil fuel power generation and extraction. For example, fossil fuel-based electric power generators experienced over $1.7 billion in reduced sales and the loss of over 1,100 jobs. Establishments involved in fossil fuel extraction in the two-county region lost almost $15 million in sales and over 40 jobs. The losses to businesses supporting oil and gas operations and drilling are low because there is little of this activity in the two-county region. The combined sales revenue loss of these five industries totaled over $1.7 billion. The employment loss exceeded 1,200 jobs in the two-county region.

To place the positive net impact of climate programs on the Inland Empire economy in context, the gross regional product for the Inland Empire is $139 billion.[10] As a result, the impact on economic activity averages 1.4 percent of gross regional product each year. With a total workforce of more than 1.3 million in 2016, the average annual addition of about 10,500 jobs accounts for 0.8 percent of annual employment.

Policy Recommendations

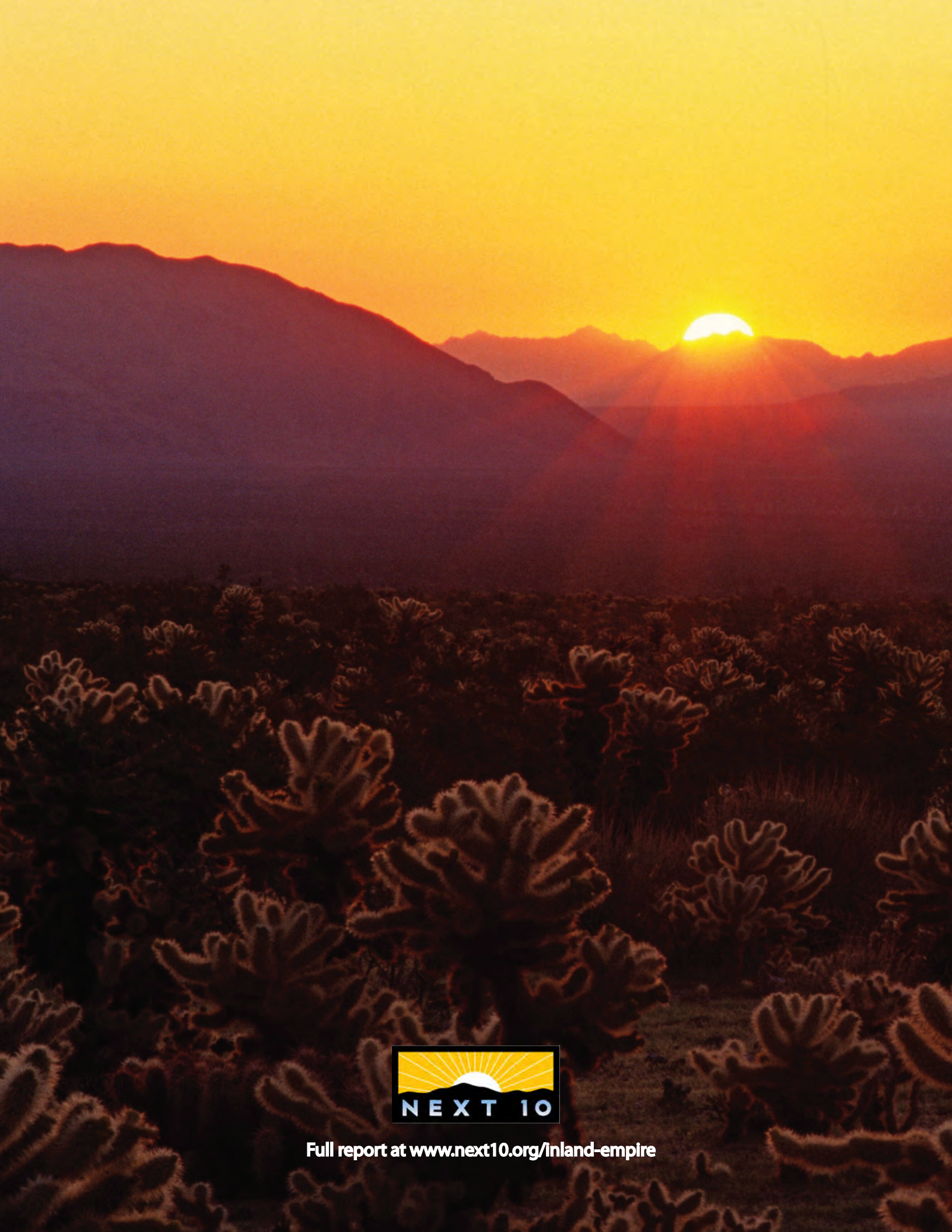
Climate programs have had positive impacts overall in the Inland Empire, but there is room for improvement. To maintain and improve the positive effects of climate policy for the region, state leaders should consider the following priority law and policy changes to ensure the state's climate programs continue to benefit the Inland Empire:

- Develop a comprehensive transportation program equal to the renewable energy programs for electricity adopted in the state. A comprehensive strategy could build on the foundation of SB 375, the low carbon fuel standard, and transportation programs such as the California Sustainable Freight Action plan to maximize benefits and minimize harm for local industry and residents. The importance of warehousing and logistics and the distances traveled by residents each day to and from work makes transportation the greatest unknown of California's climate program.
- Improve implementation of the cap-and-trade program through 2030 by considering provision of dividends to consumers in the Inland Empire to account for the higher than average transportation fuel and electricity use in the region.
- Disburse cap-and-trade auction proceeds in a timely and predictable manner and ensure that the Inland Empire receives an appropriate level of statewide spending based on its economic and environmental needs.
- Ensure that a representative share of cap-and-trade auction proceeds are spent on Inland Empire programs (including potential dividends) that create jobs, further greenhouse gas reduction benefits, and reduce co-pollutants, particularly in disadvantaged communities, per SB 535 (de Leon), AB 1550 (Gomez), and AB 398 (Garcia) governing auction revenue spending.
- Expand energy efficiency incentives and expenditures for the Inland Empire where per capita energy use is higher than the state average. This will improve the building and housing stock in the Inland Empire, reduce energy costs for residents, businesses, and industry, create jobs, and increase economic activity in the region. GGRF funding should be used, in addition to ratepayer funds.
- Develop robust transition programs for workers and communities affected by the decline of the Inland Empire's greenhouse gas-emitting industries, including re-training and job placement programs, income supports, bridges to retirement for older workers, and regional economic development and diversification initiatives.
- Improve the economic and job benefits of renewable energy and energy efficiency projects through labor agreements that promote local and career-track jobs.

California has other critical climate programs in addition to the ones studied here, such as the low carbon fuel standard, zero-emissions vehicle incentives, net-metering, plans to reduce short-lived climate pollutants, and programs to encourage cities to adopt land use and transportation plans, thus reducing dependence on automobiles. Future studies should analyze the combined impacts of these programs in addition to those studied here. This report finds overall that policymakers who wish to continue the positive momentum in the Inland Empire should stay the course on existing policies and strengthen them as recommended.

ENDNOTES

1. Chris Kirkham, "Inland Empire sees surge in warehouse jobs, but many are low-pay, temporary," Los Angeles Times, April 17, 2015.
2. Data Source: U.S. Census Bureau. "American Community Survey- American Fact Finder". Available at: https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t. (accessed June 10, 2017)
3. Ibid.
4. Patterson, Thomas Carl (2015). *From Acorns to Warehouses: Historical Political Economy of Southern California's Inland Empire*. Walnut Creek, CA: Left Coast Press.
5. Ibid.
6. According to 2016 estimates; see Footnote 2.
7. Data Source: U.S. Census Bureau, "Small Area Income and Poverty Estimates." Available at: https://www.census.gov/did/www/saipe/data/interactive/saipe.html# (2015 data) (accessed June 23, 2017).
8. Advanced Energy Economy Institute and BW Partnerships, 2016, Advanced Energy Jobs in California: Results of the 2016 California Advanced Energy Employment Survey. Available at http://info.aee.net/hubfs/PDF/california-jobs-report-2016.pdf?t=1500402638257 (Accessed July 18, 2017); Environmental Entrepreneurs (E2), 2017, Clean Energy is Powering California's Economy, Creating Jobs: How Many Clean Energy Jobs Are in Your District? Available at https://www.e2.org/cleanjobscalifornia/ (Accessed July 18, 2017); Solar Energy Industry Associates, 2016, Solar Spotlight: California, Available at http://large.stanford.edu/courses/2016/ph240/stevens2/docs/seia-sep16.pdf (Accessed July 18, 2017); The Solar Foundation, 2016, California Solar Jobs Census 2016. Available at http://www.thesolarfoundation.org/wp-content/uploads/2017/03/CA_March2017_Fact-Sheet.pdf (Accessed July 18, 2017); Colleen Callahan and Justin DeShazo, 2014, Investment Justice through the Greenhouse Gas Reduction Fund: Implementing SB 535 and Advancing Climate Action in Disadvantaged Communities, University of California, Los Angeles, Luskin Center for Innovation. Available at http://innovation.luskin.ucla.edu/sites/default/files/SB%20535%20Report%20Updated.pdf (accessed July, 18 2017); Katherine Hsia-Kiung and Erica Morehouse, 2015, Carbon Market California: A Comprehensive Analysis of the Golden State's Cap-and-Trade Program, Year Two, 2014, EDF. Available at: https://www.edf.org/sites/default/files/content/carbon-market-california-year_two.pdf (Accessed July 18, 2017); Alejandro Lazo, 2014, How Cap-and-Trade Is Working in California: Carbon Program May Hold Lesson for Other States, The Wall Street Journal, 28 September. Available at https://www.wsj.com/articles/how-cap-and-trade-is-working-in-california-1411937795 (Accessed July 18, 2017); Peter Philips, 2014, "Environmental and Economic Benefits of Building Solar in California: Quality Careers, Cleaner Lives" Donald Vial Center on Employment in the Green Economy, Institute for Research on Labor and Employment University of California, Berkeley. Available at http://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf (accessed July 18, 2017)
9. These figures are based on revenue for clothing, general merchandise, non-store, personal care, food, motor vehicle and parts, gasoline, and other miscellaneous retailers.
10. IMPLAN, model overview for two-county study region.



Full report at www.next10.org/inland-empire