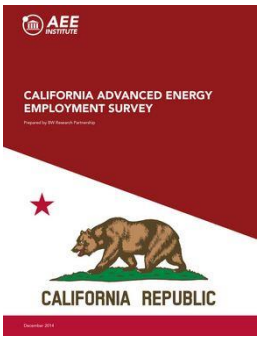
Clean Energy and Climate Change
Summary of Recent Analyses for California

E2 Advanced Biofuels Market Report 2014

By Environmental Entrepreneurs
January 2015

- Capacity in 2014 is approximately 800 million gallons gasoline equivalent.
- Capacity in 2017 may reach over 1.7 billion gallons gasoline equivalent 165 facilities planned, under construction, or operating from 180 companies.
- Nearly $4 billion in private investment into active advanced biofuel producers and value-chain companies since 2007 and$200 million in new private investments since E2's last report.
- Over $848 million in grants to advanced biofuel producers since 2007.



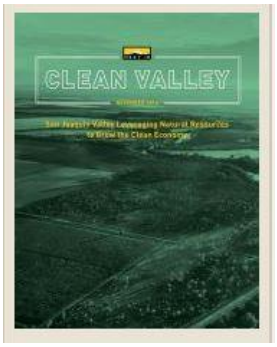
California Advanced Energy Employment Survey

By Advanced Energy Economy Institute
December 2014
http://info.aee.net/ca-jobs-report-14

- California is the nation's most populous state and the nation's leader in policies to promote secure, clean, affordable energy. It should be no surprise that California has a large and growing advanced energy economy as a result.
- This first-time survey finds that the Golden State is home to more than 40,000 businesses serving advanced energy markets, spanning the entire value chain and including a wide range of energy technologies that address both supply and demand.
- Advanced energy employment in the state is currently 431,800, an increase of 5% over last year. Employers are optimistic about the future as well, with about half of all firms expecting to add employees during the coming year, for more than 70,000 new jobs – a 17% projected increase.

2014 California Clean Tech Reports

By Next 10
November 2014



Next 10 released a series of five studies touting the progress of the California clean tech economy:

- San Joaquin Valley: http://next10.org/sanjoaquin
- Los Angeles and Orange County: http://next10.org/laoc
- San Diego and Imperial County: http://next10.org/sandiego
- Sacramento: http://next10.org/sacramento
- Bay Area: http://next10.org/bayarea

Clean Energy Works For Us: Second Quarter 2014 Report

By Environmental Entrepreneurs (E2)
http://www.e2.org/ext/doc/E2_Q2_2014_JobsReport.pdf

By tracking job announcements from companies, elected officials, the media, and elsewhere, Environmental Entrepreneurs' (E2's) jobs reports show how and where clean energy works in the United States.

- More than 12,500 clean energy and clean transportation jobs and clean transportation were announced in 29 states in the second quarter of 2014. This is more than twice the number of jobs announced in the first quarter of the year.
- When transportation fuels are included under California's landmark clean energy and climate law, AB 32, beginning in January 2015, E2 expects to see more job announcements in the clean vehicles sector.
- California is a top state for clean energy jobs with more than 2,512 CA clean energy/transportation jobs announced in the second quarter.

2014 California Green Innovation Index

By Next 10
May 2014
http://www.next10.org/2014-california-green-innovation-index

Key findings from the sixth edition of the *California Green Innovation Index*:

- California's overall renewable generation grew 56 percent between 2002 and 2012 and the state reached a new high in its renewable electricity share in 2012, producing 15.4 percent of total electricity generation, about three times the percentage of the U.S. as a whole.
- California's state electricity bill share of GDP was 0.47 percentage points less than Texas in 2012, which can be attributed to the state's nation-leading energy efficiency profile.
- California is among the most efficient, least carbon-intensive economies in the world, with per capita greenhouse gas emissions dropping by 17 percent since 1990.
- Between 2011 and 2012, registrations of zero emission vehicles (ZEVs) increased 62 percent between 2011 and 2012 to a total of about 34,500.
- California's overall clean economy continues to create new jobs and business opportunities across diverse sectors, ranging from water efficiency and recycling to energy and battery technologies. Between January 2002 and January 2012, employment in the state's Core Clean Economy jumped 20 percent to reach nearly 196,000. During the same time period, jobs in the larger overall state economy grew by two percent.

California's Low Carbon Fuel Standard: Compliance Outlook & Economic Impacts

By CalETC and other partners
April 2014 – Phase 2: http://www.caletc.com/wp-content/uploads/2014/04/ICF-Report-Final-2.pdf
June 2013 – Phase 1: http://www.clean-economy.org/wp-content/uploads/2013/06/LCFS-Phase-1-Report_Final.pdf

The objective of this two-part study from ICF International was to examine the economic impacts of Low Carbon Fuel Standard (LCFS) compliance, and the co-benefits. Highlights:

- By spurring greater use of clean alternative fuels and vehicles, the LCFS will result in $1.4 – $4.8 billion in societal benefits by 2020 from reduced air pollution and increased energy security
- The LCFS could create as many as 9,100 new jobs for California. This number could be higher, particularly if the state attracts more clean fuel production facilities and technology providers
- The LCFS is likely to lower the average price of transportation fuels and bring greater stability to fuel prices in response to fluctuating crude oil prices, as the number of competitors selling in the wholesale fuel market increases as well as the diversity of fuel types
- The LCFS is driving investment in low carbon biodiesel, ethanol, renewable diesel, biogas, and electricity

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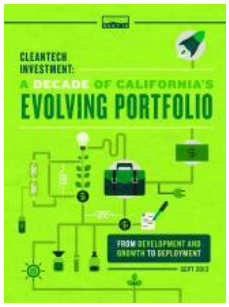
Clean Energy Works For Us: 2013 Year-In-Review and Q4 Report

By Environmental Entrepreneurs (E2)
March 2014
http://www.e2.org/ext/doc/E2CleanEnergyJobs2013Year-EndandQ4.pdf

Report highlights:

- More than 78,600 clean energy and clean transportation jobs were announced in 2013.
- California topped the list of states for the second consecutive year, with more than 15,000 jobs announced at more than 40 projects.
- Sectors with strong growth included advanced biofuels, solar, and public transportation.



Cleanteach Investment: A Decade of California's Evolving Portfolio

By Next 10
September 2013
http://next10.org/sites/next10.huang.radicaldesigns.org/files/Next10_CleanTech_final_100913.pdf

This report summarizes that the clean technology (cleantech) sector is a vital part of the economy, generating new jobs and businesses while making California's transition toward a cleaner and more efficient economy possible.

Clean Energy Jobs Quarterly Report: Q4 2012 and the year in review

By Environmental Entrepreneurs (E2)
March 2013
http://www.e2.org/ext/doc/E2CleanEnergy2012YearEndandQ4.pdf

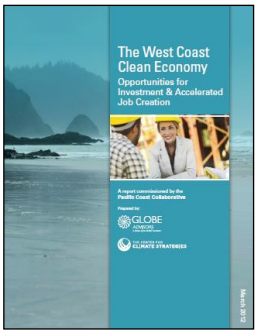
This report documents the growth of the clean energy sector. Based on new hiring by companies, cities, and organizations, the report shows that clean energy and clean transportation are helping drive innovation and job creation in America.

2013 California Green Innovation Index

By Next 10 and Collaborative Economics
March 2013
http://next10.org/sites/next10.huang.radicaldesigns.org/files/2013%20California%20Green%20Innovation%20Index%20031913.pdf

Next 10's California Green innovation index tracks the state's progress in reducing GHG emissions, generating technological and business innovation, and growing businesses and jobs that enable the transition to a more resource efficient economy as California adopts innovative energy and emissions policies.

The West Coast Clean Economy: Opportunities for Investment & Accelerated Job Creation



By The Pacific Coast Collaborative
March 2012
http://globeadvisors.ca/media/3322/wcce_report_web_final.pdf

This report was commissioned by the Pacific Coast Collaborative jurisdictions of California, Oregon, Washington and British Columbia. The report analyzes the economic growth and job creation potential within the region associated with the emerging clean economy. Key report highlights include:

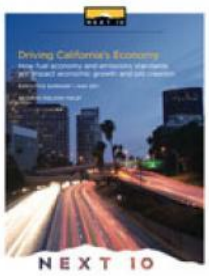
- The clean economy is the single most important global opportunity on the medium-term horizon, with revenues expected to reach $2.3 trillion by 2020.
- It is estimated that up to 1.03 million net new jobs can be created between 2010 and 2020.
- The high growth clean economy segments include: clean energy supply, clean transportation, energy efficiency and green building, environmental protection and resource management, and knowledge and support.

Many Shades of Green: California's Shift to a Cleaner, More Productive Economy

By Next 10
February 2012
http://next10.org/2012-many-shades-green-california%E2%80%99s-shift-cleaner-more-productive-economy

The report examined data on green companies, job type, location, and growth across green industry sectors and regions throughout California.

Driving California's Economy: How Fuel Economy and Emissions Standards Will Impact Economic Growth and Job Creation



By Next 10
January 2012
http://next10.org/sites/next10.huang.radicaldesigns.org/files/Final_vehicle_efficiency_report.pdf

Highlights:

- A cleaner, more efficient passenger vehicle fleet creates significant consumer savings that, when reinvested into local economies, offer a potent catalyst for economic growth.
- Increasing fuel economy and reducing emissions from passenger vehicles creates jobs across the economy, far beyond what are thought of as "green" sector and "green collar" jobs.
- When compared to California's economic performance with no fuel economy or emissions standards, improving fuel economy 4-6 percent per year starting in 2017 would have the following impacts on California by 2025: 1) the addition of 38,000 to 236,000 jobs; 2) an increase in GSP of .82 percent to 1.31 percent; 3) a reduction of 8 percent to 19 percent of state GHG emissions

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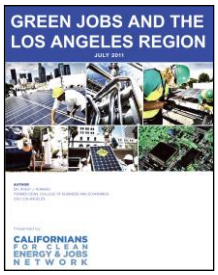
Powering Innovation: California is Leading the Shift to Electric Vehicles from R&D to Early Adoption

By Next 10
December 2011
http://next10.org/sites/next10.huang.radicaldesigns.org/files/EV%20Report_2011_final.pdf

This report highlights research tracking key indicators that assess opportunities and obstacles for California in the EV sector. California captured 69 percent of global EV investment in 2011, ranks first in nation in EV patents, and EV jobs increase during downturn.

Green Jobs and the Los Angeles Region



By Dr. Philip J. Romero, California State University, Los Angeles, Presented by Californians for Clean Energy & Jobs Network
July 2011
http://www.clean-economy.org/wp-content/uploads/2014/05/Green-Jobs-and-the-Los-Angeles-Region-5-13-11.pdf

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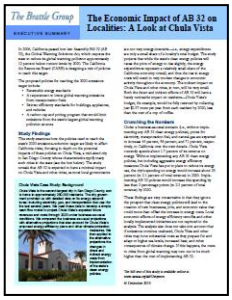
Sizing the Clean Economy: A National and Regional Green Jobs Assessment

By the Metropolitan Policy Program, Brookings Institute
July 2011
http://www.brookings.edu/metro/clean_economy.aspx

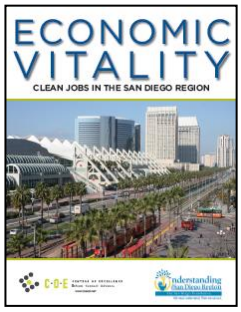
In this report, the Brookings Institute examines the nation's major metropolitan areas and all 50 states and District of Columbia. The report explores the size, growth, and geography of 39 green economy segments. The report examined several regions in California, including Bakersfield, Fresno, Los Angeles, Modesto, Oxnard, San Francisco, Sacramento, San Diego, Sacramento, and Stockton.

The Economic Impact of AB 32 on Localities: A Look at Chula Vista



By The Union of Concerned Scientists
December 2010
http://www.ucsusa.org/global_warming/solutions/big_picture_solutions/ca-ab32-econ-impacts-cities.html

Looking at Chula Vista, a mid-sized city in San Diego County, the study examined how the policies used to reach the state's 2020 emissions-reduction target are likely to affect California cities. The study revealed that AB 32 policies would have a minimal economic impact on Chula Vista and likewise, other cities, since most local governments are not very energy-intensive, spending a small share of the locality's budget on energy expenditures. The direct and indirect effects of AB 32 will have a barely noticeable impact on Chula Vista's budget, and would be fully restored by collecting just $1.97 more per year from each resident by 2020, less than the cost of a cup of coffee.

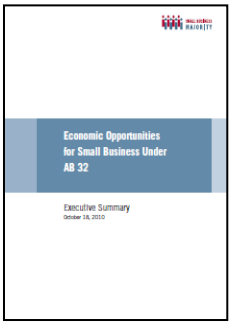


Economic Vitality: Clean Jobs in the San Diego Region

By The San Diego Foundation
December 2010
http://www.sdfoundation.org/CivicLeadership/Programs/Environment/Climate/CleanJobs.aspx

The San Diego region has become one of the fastest growing in California for clean jobs, attracting $445 million in venture capital in the last five years alone. Other factors that have contributed this growth include state and local leadership in policies that create more opportunities for business development, local demand for installing renewable energy, and innovation in energy efficiency technologies. The study found that one in ten jobs are linked to industries that are helping the region become more energy independent, developing clean and efficient technologies, reducing pollution, and keeping energy costs low.

Economic Opportunities for Small Business Under AB 32

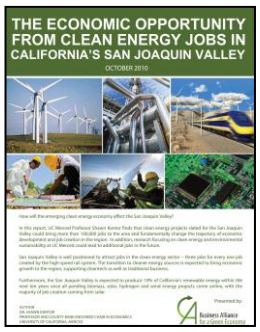


By Small Business Majority
October 2010
Summary: http://www.clean-economy.org/wp-content/uploads/2010/10/Small-Business-Majoirty_10-10AB32_ExecutiveSummary_Final.pdf
Full Report: http://www.smallbusinessmajority.org/energy/index_CA_AB-32.php

This report found that AB 32 provides opportunities for small businesses to gain a financial edge in the burgeoning clean energy sector, and lays the foundation for significant growth in many industries connected to it.

The opportunities include:

- Increased investment in energy efficiency, leading to more demand for energy efficiency goods and services.
- Incentives for companies to go green, which could create savings and brand differentiation potential.
- Increased spending on non-energy purchases. Energy efficiency savings and making the switch from volatile fossil fuel energy sources to renewables will make resources available for other purchases.
- Additional investment in new innovation and clean technology firms.

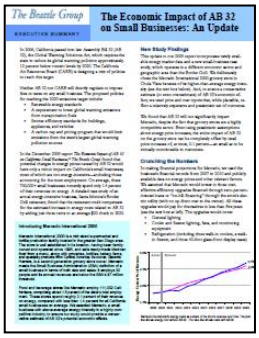


The Economic Opportunity from Clean Energy Jobs in California's San Joaquin Valley

By Dr. Shawn Kantor, University of California, Merced, presented by the California Business Alliance for a Green Economy
October 2010
http://www.clean-economy.org/wp-content/uploads/2010/10/SJV_Econ_Study_10-13-10.pdf

The report finds that clean energy projects slated for the San Joaquin Valley could bring more than 100, 000 jobs and fundamentally change economic development and job creation in the region. With the state looking to the San Joaquin Valley to help satisfy its renewable energy needs, the Valley is well positioned for economic growth, attracting jobs in the cleantech and clean energy sectors.

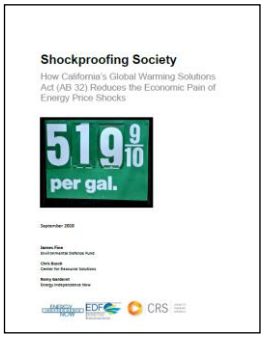
The Economic Impact of AB 32 on Small Business: An Update



By The Brattle Group
October 2010
Summary: http://www.brattle.com/news-and-knowledge/news/283
Full Report:
http://www.brattle.com/system/publications/pdfs/000/004/710/original/2010_Update_to_Economic_Impact_of_AB_32_on_Small_Business_-_An_Update_Weiss_Sarro_Oct_2010.pdf?1378772123

Brattle Group economists updated their 2009 report: *The Economic Impact of AB 32 on California Small Businesses*, which looked at how AB 32 is likely to impact small businesses across the state. The Mercado International 2000 grocery store in Chula Vista served as the case study for the 2010 update. The report reaffirmed its previous finding that AB 32 will not significantly impact small businesses. Despite how Mercado International is in the highly competitive grocery store sector, the impact of AB 32 could be completely offset by retail price increases of, at most, 0.1 percent—so small as to be virtually unnoticeable to customers.

Shockproofing Society: How California's Global Warming Solutions Act (AB 32) Reduces the Economic Pain of Energy Price Shocks



By Energy Independence Now, Environmental Defense Fund, and Center for Resource Solutions
September 2010
http://www.resource-solutions.org/pub_pdfs/Shockproofing%20Society.pdf

This first-of-its-kind study examined the nation's previous crude oil price shocks and how California's clean energy and clean air standards would shield households from future price shocks. If an oil price shock occurred in 2020, California consumers and businesses would save between $4.8 and $9.6 billion, depending on the size of the price shock. The average household would save up to $670 in 2020 if oil and natural gas prices doubled and stayed there for a year. The savings would come from reduced demand for imported oil and natural gas through a suite of AB 32 standards, such as more efficient cars, greater alternative fuel and energy options, and more efficient buildings.

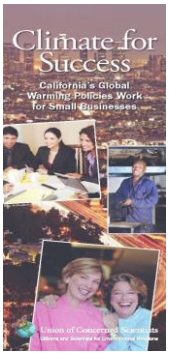
California's Green Economy

By The California Employment Development Department, Labor Market Information Division
April 2010
http://www.labormarketinfo.edd.ca.gov/contentpub/GreenDigest/CaliforniaGreenEconomy.pdf

The California Employment Development Department (EDD) survey found that more than 300,000 people spend the majority of their time and another 171,000 workers spend part of their time on producing green products or providing green services. California is leading the nation in the percentage of the labor force working at green jobs.

The Economic Impact of AB 32 on California Small Businesses

By The Brattle Group
December 2009
http://www.brattle.com/system/publications/pdfs/000/004/711/original/The_Economic_Impact_of_AB_32_on_CA_Small_Bus_Weiss_Sarro_Dec_2009.pdf?1378772123



This first-of-its kind economic analysis examined how California's AB 32 policies will impact small businesses. Using the Border Grill restaurant in Los Angeles as a case study, economists at the Brattle Group concluded that the policies will increase the percent of revenue the Border Grill spends on energy by a mere 0.3 percent—increasing the share of revenues dedicated to energy costs from 1.4 percent to 1.7 percent in 2020. Moreover, this a conservative estimate because the report does not factor in the full range of cost savings that could come from energy efficiency investments. By 2020, the cost of a typical dinner would rise about 0.1 percent—or less than three cents for every $20.