

ECONOMIC IMPACT ANALYSIS

Advanced Alternatives: World Energy Paramount Renewable Fuels Project



Understanding the Impact of Investment



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This report was commissioned by World Energy, LLC.

The LAEDC Institute for Applied Economics offers objective economic and policy research for public agencies and private firms. The group focuses on economic impact studies, regional industry analyses, economic forecasts, and issue studies, particularly in water, transportation, infrastructure and environmental policy.

Every reasonable effort has been made to ensure that the data contained herein reflect the most accurate and timely information possible and they are believed to be reliable.

The report is provided solely for informational purposes and is not to be construed as providing advice, recommendations, endorsements, representations, or warranties of any kind whatsoever.

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Executive Summary

As solutions are sought to address both global climate change and regional air pollution, there is increasing awareness of the need for lower carbon fuels that are sustainably derived, and this is especially true in the transportation sector. Transportation accounts for approximately [29%](#) of greenhouse gases (GHG) emitted by the United States, [41%](#) of California's GHG emissions, and creates the majority of air quality degradation in Los Angeles County.

To address these issues, California has adopted significant goals for transportation emission reduction across many transportation modes, but there will still be a need for fueling combustion-based transportation engines well into the future. In particular, these low-carbon fuels will be needed in applications where battery technology or other zero emissions vehicle (ZEV) alternatives don't meet energy density or operational requirements, notably in air transportation and the heavy-duty vehicle sectors. An alternative that is consistent with both GHG reduction goals and pollution reduction is the use of lower-carbon, sustainable biofuels, which [emit significantly less GHGs](#) than petroleum fuels and have other favorable environmental aspects, including biodegradability in the environment. These characteristics are leading many business operations and fleets to adopt use of sustainable biofuels as part of the mix of solutions that will decrease GHG emissions and improve air quality regionally. The process of biofuel production is also less impactful to the environment in geographies that host such facilities, compared to traditional petroleum refining.

Beyond the environmental benefits of biofuel and low- or zero-carbon fuel adoption, there are positive economic impacts from biofuel production operations, the related investments, and many supporting activities in the economy. This is realized in the form of green jobs providing labor income, contributions to regional gross output, tax revenues which support delivery of services to communities, and large indirect and induced economic benefits.

This report provides analysis of those economic impacts for the investment World Energy is making in a new biofuel production facility and its future operations in Paramount, California.

For more than two decades, World Energy has been a national and international provider of biomass-based diesel and, in the last five years, has added sustainable aviation fuel (SAF) and other renewable biofuels to its product portfolio. World Energy's production process uses inedible waste products from the food and agricultural industries and turns them into clean energy for planes, heavy-duty vehicles, and public transit. As local, state, and federal interest in reducing emissions intensifies and the public and private sector demand innovative solutions to demonstrate efforts against climate change, the green energy market will continue to experience rapid growth and increased diversification.



World Energy is completing the conversion of its Paramount facility to reconfigure and enhance operations to produce renewable fuels and hydrogen. The LAEDC estimates this conversion will add over 18,000 jobs nationwide.

World Energy’s facility is located in Paramount, California, in Southeast Los Angeles County. Purchasing the Paramount refinery in 2018, World Energy has undertaken the task of wholly converting the refinery’s facilities and capacity to the production of renewable fuels. When completed, this capital investment will allow for 25,000 barrels per day of renewable fuels to meet increasing local demand for low-carbon intensity fuels for commercial motor vehicles, including trucks and heavy-duty vehicles, and aviation.

World Energy Paramount is the first U.S. conversion of a legacy petroleum refinery into a clean energy renewable biorefinery.

In a multiregional economic impact analysis, the Los Angeles County Economic Development Corporation (LAEDC) Institute for Applied Economics (IAE) estimated that World Energy’s ongoing operations in Los Angeles County and California during the six years of 2019-2024 would produce:

World Energy’s operations are estimated to produce \$19.2 billion in additional output and \$6.4 billion in additional value added in the US, and almost \$1.3 billion in federal, state and local taxes.

- \$12.2 billion in additional output in the US outside California (\$7.0 billion in California)
- \$4.3 billion in value added in the US outside California (over \$2.0 billion in California)
- \$2.3 billion in labor income in the US outside California (\$1.1 billion in California)
- Over \$857 million in federal, state and local taxes in the US outside California (\$469 million in California).

Exhibit E-1 presents these findings spanning over six years.

Under the Renewable Fuels Project heading, World Energy will complete the Paramount refinery conversion to reconfigure and enhance the facility to produce 100 percent renewable fuel and hydrogen fuel. With an estimated \$2.0 billion capital expenditure between 2020 and 2023, the LAEDC IAE estimates these investments will produce an additional \$769.7 million in output, over \$292 million in labor income, and \$89.4 million in federal, state, and local taxes in Los Angeles County alone, including the City of Paramount. Moreover, these

Exhibit E-1
World Energy LLC's Annual Ongoing Operations 2019-2024
Total Economic Impact
All Geographies Summary

	LA County/ Rest of CA	Rest of the U.S.
Output (\$ mil)	\$6,982.6	\$12,230.8
<i>Direct</i>	4,538.9	3,811.9
<i>Indirect & Induced</i>	2,443.7	8,418.9
Value Added (\$ mil)	\$2,063.1	\$4,341.2
<i>Direct</i>	771.7	736.7
<i>Indirect & Induced</i>	1,291.4	3,604.5
Employment*	5,360	12,940
<i>Direct</i>	1,870	1,750
<i>Indirect & Induced</i>	3,490	11,190
Labor Income (\$ mil)	\$1,115.0	\$2,279.7
<i>Direct</i>	365.3	369.5
<i>Indirect & Induced</i>	749.7	1,910.2
Total Fiscal Impacts (\$ mil)	\$469.1	\$857.1
<i>State and Local Taxes</i>	230.3	368.5
<i>Federal Taxes</i>	238.8	488.6

*May not sum due to rounding
 Source: World Energy; Estimates by LAEDC

capital expenditures are estimated to support an annual average of 1,040 jobs in Los Angeles County. Exhibit E-2 provides additional estimated impacts from these capital expenditures for Los Angeles County, California

as a whole, and the United States in total. These estimated job gains in the county, state, and country will take place amid an economy that will likely still be recovering from the COVID-19 recession, including in industries most significantly impacted by the associated business restrictions and closures. These estimates are given for the four-year project period from 2020 to 2023.

As detailed in Section 6, World Energy’s ongoing activities and expanded business footprint in Paramount could provide immediate and near-future solutions to local, regional, and state ambitions concerning climate change, emissions reduction, and public health. By increasing its capacity to deliver renewable fuels to the Southern California region, World Energy provides lower and zero-emissions solutions to the local port and airport operators that can use these biofuels today. Renewable biofuels help provide a diversified offering of solutions to address regional and state climate and air quality goals. Set by local regulators, these goals promote public health and environmental sustainability and secure critical state and federal infrastructure funding.

As the LAEDC analysis shows, World Energy is estimated to drive significant and positive economic impacts in the region and increase opportunities for state and regional governing bodies to implement healthier and more sustainable operations in Southern California.

Exhibit E-2

World Energy LLC's Capital Expenditures 2020-2023

**Total Economic Impact
All Geographies**

	City of Paramount	Rest of Los Angeles County	Rest of California	Rest of U.S.
Output (\$ mil)	106.3	663.3	881.9	2,547.1
<i>Direct</i>	64.7	395.8	488.3	925.9
<i>Indirect & Induced</i>	41.6	267.6	393.6	1,621.2
Value Added (\$ mil)	64.6	369.3	503.2	1,253.5
<i>Direct</i>	39.1	207.0	266.0	416.1
<i>Indirect & Induced</i>	25.5	162.3	237.2	837.4
Employment (jobs, annual average contribution)*	200	840	1,090	2,980
<i>Direct</i>	130	480	580	1,070
<i>Indirect & Induced</i>	70	360	510	1,910
Labor Income (\$ mil)	46.3	246.1	344.1	817.3
<i>Direct</i>	31.2	147.4	201.8	320.8
<i>Indirect & Induced</i>	15.1	98.8	142.3	496.5
Total Fiscal Impact (\$ mil)	11.7	77.7	105.9	257.9
<i>State and Local Taxes</i>	4.3	29.9	38.0	89.1
<i>Federal Taxes</i>	7.4	47.8	67.8	168.8

*May not sum due to rounding
Source: World Energy; Estimates by LAEDC

Renewable biofuels help provide a diversified basket of solutions to various regional and state climate and air quality goals.

\$2.0 billion of capital expenditures through the Renewable Fuels Project is estimated to add \$769.7 million in output, over \$292 million in labor income and \$89.4 million in total tax revenues in Los Angeles County, including the City of Paramount.

Section 1: World Energy and Southern California Operations

In March 2018, World Energy acquired the Paramount facility and associated pipeline systems from Delek US. As part of its acquisition, World Energy announced an additional investment to complete the facility's conversion into a 100 percent renewable and SAF operation, adding significant local construction investment and related employment.

Although the Paramount facility is currently permitted to feed 39,500 barrels per day of crude oil to make petroleum fuels and asphalt, World Energy does not produce those products. Today, the company has the permits to convert the remaining and idle crude oil refinery into a green energy facility that will produce 3,500 barrels of renewable fuels per day or 45 million gallons per year. After the conversion is complete, California will be home to one of the largest advanced renewable fuel producers and the world's first SAF facility. This site contains:

- Storage for more than 1.7 million barrels of product
- Truck loading racks with 28,000 barrels per day of throughput capacity
- Rail storage for up to 55 rail cars

World Energy also established a subsidiary, Paramount Pipeline, to own and operate the pipeline system stretching over 71 miles and connecting the facility to major southern California distribution hubs, including the Kinder Morgan terminal and pipelines, and the Port of Long Beach.

The renewable fuel production at World Energy is a strategic effort to support the California State Legislature's environmental policies passed in 2006, namely the Global Warming Solutions Act (AB 32).¹ With the continued production of renewable fuels and planned improvements, World Energy will increasingly contribute to the reduction of the commercial greenhouse gas emissions from vehicles and aviation while at the same time providing more local construction and full-time jobs.

About World Energy

World Energy is a global supplier of low-carbon intensity energy solutions. With a portfolio of seven biomass-based diesel plants and a proprietary pipeline network, the company produces, stores, transports, and markets biomass-derived fuels and products globally.

World Energy employs more than 250 people, including 90+ full-time team members at the Paramount facility. World Energy also operates facilities in Texas, Mississippi, Georgia, Pennsylvania, and Ontario, Canada. Its corporate office is in Boston, Massachusetts.

¹ AB 32 Global Warming Solutions Act of 2006. California Air Resources Board. 28 September 2018.

Across World Energy’s seven production sites, non-food grade feedstocks are procured from renewable resources. Currently, these include used cooking oil, distillers corn oil, soy oil, and tallow. The World Energy Paramount feedstocks are independently certified to meet sustainability standards for renewable fuels.



Background

The Paramount facility was constructed as an oil refinery in the late 1920s before the development of the surrounding residential neighborhoods. AltAir Paramount, LLC, partnered with Alon USA in 2013 to produce renewable fuels and replace the crude oil operation at the site.

Incentivized by the state and federal low-carbon policies, including California's AB 32 and the Low Carbon Fuel Standard, AltAir repurposed a portion of the Paramount refinery to produce sustainable, renewable, biomass-based SAF, diesel, and gasoline fuels.

Since 2016, this site has continuously produced and distributed these renewable products to major fuel users like the Department of Defense, United Airlines, Boeing, UPS, and several California municipalities and school systems. In 2018, World Energy purchased the Paramount facility and the pipeline assets that stretch over 71 miles and connect the facility to major Southern California distribution hubs, including Long Beach.

One of the Paramount facility’s first major accomplishments was becoming the sole supplier of SAF to United Airlines since 2016. In 2020, Amazon Air secured up to six million gallons of SAF from Shell Aviation produced by World Energy. Building on this success, World Energy is committed to invest further for additional conversion and modernization of the Paramount facility.

Exhibit 1-1 Local Economic Profile City of Paramount

Total Population	54,513
<i>Working Prime Age Population</i>	20,359
<i>Unemployment Rate</i>	5.3%
Income (\$)	
<i>Average</i>	\$ 33,861
<i>Median</i>	\$ 41,762

Source: 2019 ACS 5-Year Estimates

Proposed Improvements & Operations

Retrofitting and Modernizing Equipment

Under the Renewable Fuels Project heading, World Energy will convert and modernize the balance of the facility, including its equipment, supporting utilities, and logistics assets to complete the state-of-the-art facility. The project will convert approximately 50 tanks from crude oil and petroleum product service and retrofit rail facilities from previous asphalt use to support renewable feedstocks and finished fuel products.

Production Conversion and Enhancement

World Energy Paramount is currently seeking permits to augment its production of renewable fuels and modernize its assets within the existing facility location. The project will increase the production of renewable products while eliminating the potential for crude oil refining at the site. Once permitted and converted, the facility will produce up to 25,000 barrels per day of renewable fuels.

Safety

Safety is World Energy’s Priority

World Energy’s work to minimize its impact on the local community by transporting more of its products by pipelines and railcars has various positive economic and community benefits. Furthermore, World Energy’s commitment to safety and health reduce economic externalities, via:

- Identifying technologies and methods to ensure safe/secure workplaces, products, and processes;
- Considering health and safety in any new process development and investment decisions, in its dealings with contractors and suppliers, and its relationship with the public;
- Providing the support necessary to sustain a culture in which every employee is trained and motivated to manage risk properly and promote health and safety throughout the organization.

Benefits

Cleaner Air

The World Energy Paramount facility has produced more than 150 million gallons of renewable fuels since 2016. This renewable fuel production volume is equivalent to 1.3 Million Metric Tons of carbon dioxide equivalent (CO₂e) in global savings of greenhouse gas emissions or removing more than 250,000 vehicles from the road. After the planned Renewable Fuels Project, this benefit will grow to more than four Million Metric Tons of CO₂e annually from nearly four hundred million gallons of renewable fuels produced per year. These fuels will be clean burning, with no sulfur or soot generating aromatic hydrocarbon compounds that are found in conventional fossil fuels. In economic terms, by directly addressing negative externalities of the prior oil refining operation related to air quality and public health, there are a variety of reduced costs to the region related to the facility’s new biofuels focus.

Exhibit 1-2

Near-Term Emissions Reduction from Renewable Diesel Blended with Biodiesel, SAF and Renewable Naphtha

Pollutant	% Reduction
CO ₂ Equivalent	Up to 80%
Oxides of Nitrogen (NO _x)	Up to 10%
Particulate Matter (PM)	Up to 35%
Oxides of Sulfur (SO _x)	Up to 100%

Source: World Energy

Community Programs

The Paramount area developed over many decades, and today, residential communities, schools, and a shopping center surround the facility. As the facility is not located within a traditional industrial area, and consistent with its corporate policies and culture, World Energy seeks to meaningfully engage with nearby residents and schools. World Energy supports the following community programs, organizations, and committees, which contribute to livable communities and investment in people, both of which are goals of the *2016-2020 LA County Strategic Plan for Economic Development*:

- Educational programs with the local schools and community, including mentorship opportunities for students and Paramount Education Partnership scholarships;
- Board members of the Paramount Chamber of Commerce and Southeast Los Angeles County Workforce Development Board, supporting local hiring;
- Public health and environmental justice organizations, including the Coalition for Clean Air, with investments in tree planting in Paramount and other communities.

Additionally, World Energy has established several communication channels to promote an open dialogue with the community and ways for residents to connect with the company, including:

- A 24/7 community helpline, in English and Spanish, for responses to community concerns or questions;
- A dedicated resource on the corporate website (www.worldenergy.net/paramount/), in English and Spanish, with information specific to the Paramount facility and the Renewable Fuels Project;
- A Facebook page on social media dedicated to the Paramount facility and the Renewable Fuels Project;
- A web-based signup form for community members to register for newsletter updates.

Jobs

World Energy Paramount currently employs more than 90 individuals on a full-time basis. As the previous owner was reducing the workforce, the Renewable Fuels Project at Paramount was able to retain and retrain many of the employees into the green economy and has since generated additional job opportunities. World Energy's October 2018 announcement of additional investment to complete the facility conversion represents additional local construction and related employment. A more complete analysis of the jobs impact is found in this report.

World Energy Products

World Energy is helping meet the world's growing demand for clean energy. The company's operation makes the transition to low-carbon fuels possible for businesses that want to transition to a more sustainable future. World Energy's renewable products provide a cleaner energy source, reducing full life cycle GHG emissions by up to 80 percent relative to fossil fuels for products today, and further reductions are anticipated.

Renewable Diesel

Renewable Diesel is a 100 percent sustainable fuel typically produced from waste animal fats, vegetable oils, and used cooking oils. World Energy Paramount uses a hydrotreating production method that produces renewable diesel, a transportation fuel that burns cleaner while reducing exhaust emissions. Renewable diesel is a drop-in fuel, which means it can be used directly as a motor vehicle fuel without requiring any blending of the fuel or modifications to the vehicle engine. It is a direct replacement for petroleum generated diesel. In economic terms, this benefits the local economy by lessening the cost burden on vehicle independent operators who often bear the expense of switching to clean air vehicles. Renewable diesel meets and exceeds industry standards as well as those set by the California Air Resources Board (CARB). All fuels produced at the Paramount facility are free of sulfur and aromatics compounds.

Biodiesel

Biodiesel is an advanced biofuel commercially available in the U.S. made from renewable resources such as plant oils, animal fats, and used cooking oil. Biodiesel significantly reduces carbon intensity and is biodegradable, non-toxic, free of aromatics, and nearly free of sulfur. The biodegradability eliminates another negative externality that is common with legacy fuel operations, related to long-term environmental impact.

Sustainable Aviation Fuel (SAF)

SAF is a class of non-petroleum-based jet fuels (or blended components) that is being pursued by the industry to reduce net life-cycle carbon dioxide (CO₂) emissions from aviation operations. Relative to fossil fuels, sustainably produced aviation fuel, similar to renewable diesel and biodiesel, has shown a proven net reduction in CO₂ emissions across its life cycle. These fuels provide between 60 to 80 percent reductions in greenhouse gas emissions compared to their petroleum-based counterparts. Because approximately 2.5 percent of global GHGs are created through air transportation - with that percentage growing - this reduction is a meaningful way to make air transport greener and more sustainable. SAF also offers air quality advantages beyond GHG reductions, including PM and sulfur reductions.

Renewable Naphtha

Renewable Naphtha is a major component for gasoline-fueled vehicles. It can be blended with either a renewable or fossil base octane enhancer (alkylate) or ethanol to make low carbon gasoline or E85, a 100 percent renewable gasoline substitute.

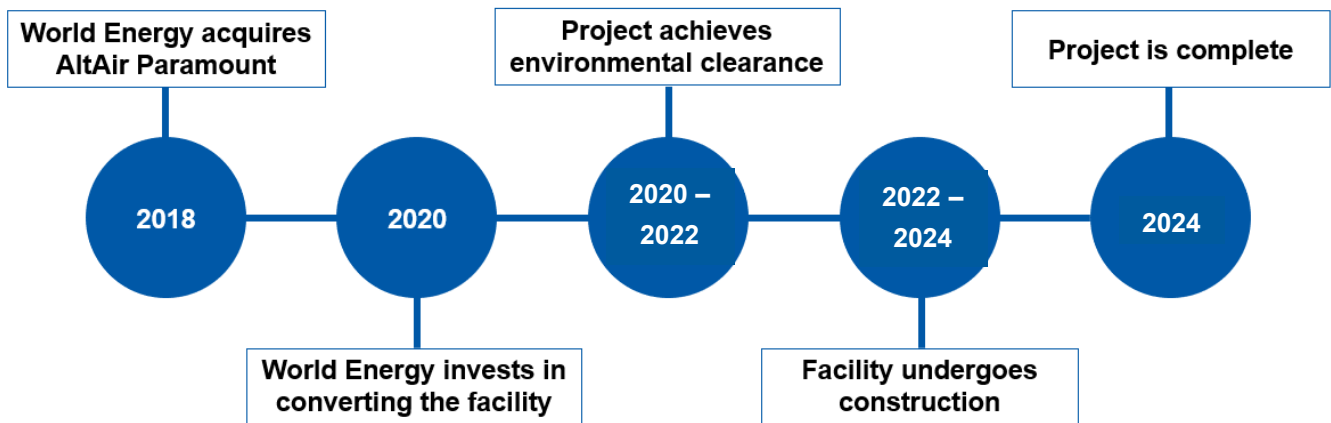
Renewable Propane

Renewable Propane is a clean-burning, direct replacement for fossil fuel propane and can be used as fuel for on and off-road vehicles and is well suited for fleets since centralized storage is possible for large users. Additional fossil-based propane applications in Southern California, such as home heating and agricultural markets, could also use this fuel.

Hydrogen

Hydrogen can be a zero-emission fuel, depending on its production technology, feedstocks, and CO2 treatment. When burned, hydrogen’s emissions are simply water vapor. Fuel cell passenger vehicles have been commercially available for several years, using hydrogen to generate electric propulsion power. Hydrogen affords the same convenience of quick fueling capabilities as liquid fuels. Fuel cell trucks and buses are expected to be commercially available over the next several years and are critical to achieve significant emission reduction goals of regional and state air pollution and climate plans. A key component of the Renewable Fuels Project in Paramount is establishing hydrogen production on-site with excess capacity to provide this zero-emissions fuel to the Southern California market. This future-forward investment will increase the region’s supply of hydrogen, enabling more adoption of hydrogen zero-emission vehicles.

Timeline for Renewable Fuels Project



Section 2: Research Methodology

Methodology

Economic impact analysis is used to estimate the overall economic activity, including spill-over and multiplier impacts resulting from a particular business, event, or geography. In this case, the event is both the increased production and the capital expenditures of World Energy and the impacts of both in Los Angeles County, the rest of the state of California, and the rest of the country. The value of the estimated ongoing expenditures and capital expenditures are the basis of quantification of these events.

The extent to which the initial event multiplies through the economy is estimated using economic models that depict the relationships between industries (such as petroleum products manufacturing and its suppliers) and among different economic agents (such as industries and their employees).

These models are built upon actual data of expenditure patterns that are reported to the U.S. Bureau of Labor Statistics, the U.S. Census Bureau, and the Bureau of Economic Analysis of the U.S. Department of Commerce. Data is regionalized to reflect and incorporate local conditions such as prevailing wages rates, expenditure patterns, and resource availability and costs.

The magnitude of the multiplying effect differs from one region to another depending on the extent to which the local region can fill the demand for all rounds of supplying needs. For example, the automobile manufacturing industry has high multipliers in Detroit and Indiana since these regions have deep and wide supplier networks, while the same industry multiplier in Phoenix is quite small.

Multipliers can also differ from year to year as relative material costs, labor costs, and the production “recipe” of industries change. For example, the IT revolution significantly reduced the job multiplier of many industries (such as manufacturing, accounting, architecture, and publishing) as computers replaced administrative and production workers.

The metrics used to determine the value of the economic activity are employment, labor income, value-added, and the value of output. Employment includes full-time, part-time, permanent, and seasonal employees, as well as those who are self-employed. Employment is measured on a job-count basis regardless of the number of hours worked. Labor income includes all income received by both payroll employees and the self-employed, including wages and benefits such as health insurance and pension plan contributions. Value-added is the measure of the contribution to GDP made by the overall impacts and consists of compensation of employees, taxes on production, and gross operating surplus. Output is the value of the goods and services produced. For most industries, this is simply the revenues generated through sales; for others, in particular retail industries, output is the value of the services supplied.

Estimates are developed using software and data from IMPLAN Group, LLC, which traces inter-industry transactions resulting from an increase in demand in a given region. Results are reported for two geographic areas, the City of Paramount and Los Angeles County as a whole. All values are expressed in 2020 dollars.

Expenditure estimates are inputs into the IMPLAN model to approximate indirect and induced effects. This process captures both the estimated value of World Energy’s increased ongoing expenditures from 2019

through 2024 and its capital expenditures through 2023, the target completion date of the Renewable Fuels Project at the Paramount facility.

The total estimated economic contribution includes direct, indirect, and induced effects. The direct activity includes the materials purchased and the employees hired by World Energy. Indirect effects stem from the employment and business revenues motivated by the purchases made by World Energy and any of their suppliers. Induced effects are generated by the expenses of employees whose wages are sustained by both direct and indirect spending.

Fiscal benefits include all taxes paid by business and households supported by the direct, indirect, and induced activity including: sales taxes, property taxes, personal income taxes, corporate profits taxes, social insurance taxes, and other payments to governments.

Description of NAICS Industry Sectors

The industry sectors used in this report are established by the North American Industry Classification System (NAICS). NAICS divides the economy into twenty sectors and groups industries within these sectors according to production criteria. Listed below is a short description of each sector as taken from the sourcebook, North American Industry Classification System, published by the U.S. Office of Management and Budget (2017).

Agriculture, Forestry, Fishing, and Hunting: Activities of this sector are growing crops, raising animals, harvesting timber, and harvesting fish and other animals from farms, ranches, or the animals' natural habitats.

Mining: Activities of this sector are extracting naturally-occurring mineral solids, such as coal and ore; liquid minerals, such as crude petroleum; and gases, such as natural gas; and beneficiating (e.g., crushing, screening, washing and flotation) and other preparation at the mine site, or as part of mining activity.

Utilities: Activities of this sector are generating, transmitting, and/or distributing electricity, gas, steam, and water and removing sewage through a permanent infrastructure of lines, mains, and pipes.

Construction: Activities of this sector are erecting buildings and other structures (including additions); heavy construction other than buildings; and alterations, reconstruction, installation, and maintenance and repairs.

Manufacturing: Activities of this sector are the mechanical, physical, or chemical transformation of material, substances, or components into new products.

Wholesale Trade: Activities of this sector are selling or arranging for the purchase or sale of goods for resale, capital or durable non-consumer goods, and raw and intermediate materials and supplies used in production and providing services incidental to the sale of the merchandise.

Retail Trade: Activities of this sector are retailing merchandise generally in small quantities to the general public and providing services incidental to the sale of the merchandise.

Transportation and Warehousing: Activities of this sector are providing transportation of passengers and cargo, warehousing and storing goods, scenic and sightseeing transportation, and supporting these activities.

Information: Activities of this sector are distributing information and cultural products, providing the means to transmit or distribute these products as data or communications, and processing data.

Finance and Insurance: Activities of this sector involve the creation, liquidation, or change of ownership of financial assets (financial transactions) and facilitating financial transactions.

Real Estate and Rental and Leasing: Activities of this sector are renting, leasing, or otherwise allowing the use of tangible or intangible assets (except copyrighted works) and providing related services.

Professional, Scientific, and Technical Services: Activities of this sector are performing professional, scientific, and technical services for the operations of other organizations.

Management of Companies and Enterprises: Activities of this sector are the holding of securities of companies and enterprises, for the purpose of owning controlling interest or influencing their management decision, or administering, overseeing, and managing other establishments of the same company or enterprise and normally undertaking the strategic or organizational planning and decision-making of the company or enterprise.

Administrative and Support and Waste Management and Remediation Services: Activities of this sector are performing routine support activities for the day-to-day operations of other organizations, such as office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services.

Educational Services: Activities of this sector are providing instruction and training in a wide variety of subjects. Educational services are usually delivered by teachers or instructors that explain, tell, demonstrate, supervise, and direct learning. Instruction is imparted in diverse settings, such as educational institutions, the workplace, or the home, through correspondence, television, or other means.

Health Care and Social Assistance: Activities of this sector are operating or providing health care and social assistance for individuals.

Arts, Entertainment, and Recreation: Activities of this sector are operating facilities or providing services to meet varied cultural, entertainment, and recreational interests of their patrons, such as: (1) producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) preserving and exhibiting objects and sites of historical, cultural, or educational interest; and (3) operating facilities or providing services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

Accommodation and Food Services: Activities of this sector are providing customers with lodging and preparing meals, snacks, and beverages for immediate consumption.

Other Services (except Public Administration): Activities of this sector provide services not specifically provided for elsewhere in the classification system. Establishments in this sector are primarily engaged in activities such as equipment and machinery repairing, promoting or administering religious activities, grantmaking, advocacy, and providing dry-cleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services.

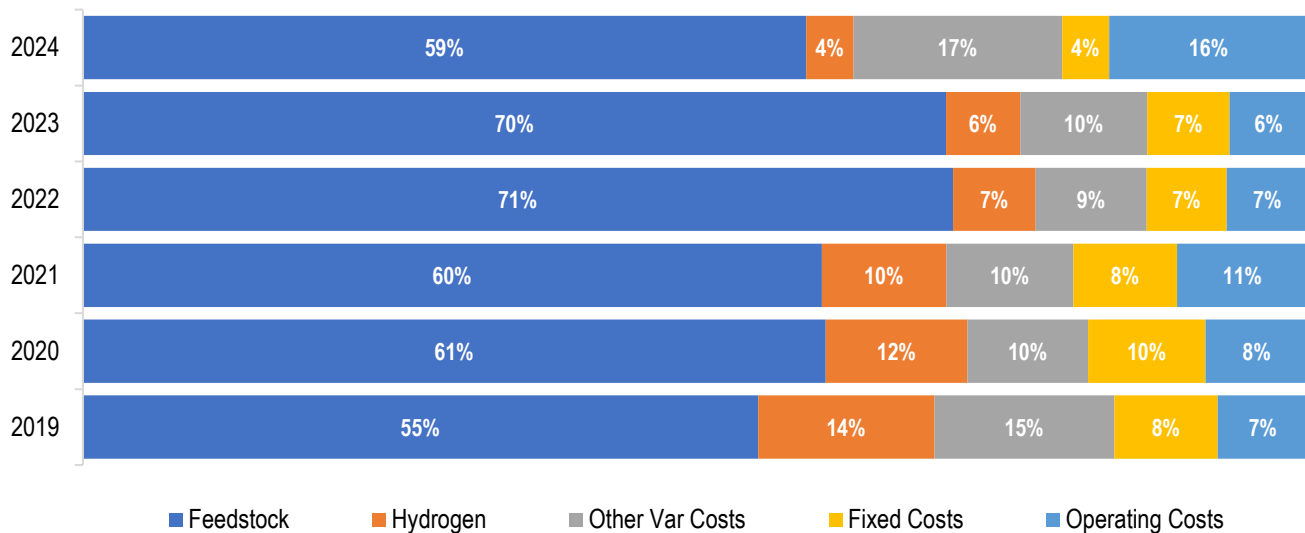
Section 3: World Energy Annual (Ongoing) Expenditures

In 2018, World Energy purchased from Delek US (owner of Alon USA and Paramount Petroleum Corporation) their interest in SAF and renewable diesel producer AltAir Paramount, LLC, and the associated Paramount refinery site with its pipeline system. The purchase included the entire 66-acre complex with storage for 1.7 million barrels of product and the capability of producing 45 million gallons of product per year. It will take until 2023 for World Energy to ramp up production to achieve the Paramount complex’s design capacity. During this time, the economic impacts will fluctuate. Presented below is a multiyear and multiregional analysis of World Energy’s Paramount facility.

LAEDC used the IMPLAN Group to calculate expected effects from the investment spending anticipated during the next several years and the economic activity created from existing and expanding operations to estimate the ongoing economic impact across Los Angeles County, the rest of California, and the rest of the United States.

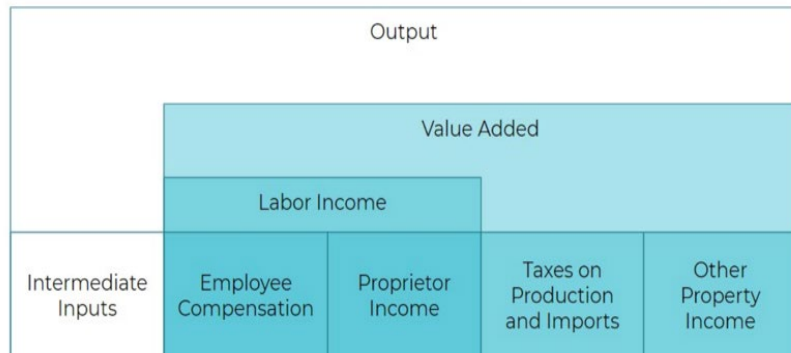
LAEDC required specific inputs from World Energy to develop the analysis. Displayed in Exhibit 3-1, these inputs highlight feedstock, hydrogen, and other variables, fixed costs, and operating costs as a percentage of total costs. World Energy provided the percentages for 2020 as estimates. For 2021 onward, the percentages provided are forecasts. These estimates and forecasts may change over time, leading to the change in the multi-regional impacts and spill-over effects.

Exhibit 3-1: World Energy Annual Expenditures by Category, 2019-2024



The multi-year economic impacts for Los Angeles County and the rest of California are presented in Exhibit 3-3 (multi-year impacts for the rest of the United States are provided later in the section, in Exhibit 3-5). LAEDC developed these impacts with IMPLAN’s input-output economic modeling software. The inputs used were the values behind the percentages provided by World Energy in Exhibit 3-1. All dollar values are reported in 2020 dollars unless stated otherwise. Job impacts in this section and in Section 4 should be read as the total number of jobs supported in that year and not as net new jobs added to the economy in that year. The differences between annual estimated job impacts should be calculated to determine net new jobs between years.

Exhibit 3-2: A Breakout of Economic Analysis



The output represents the value of production in the given calendar year as a result of World Energy’s Paramount activities. While the output value is already significant at \$608 million, it is expected to grow nearly seven-fold by 2024. As stated before, this is due to the ramping up of production at the Paramount facility. The output consists of intermediate inputs and value-added. Value-added, which goes hand in hand

Exhibit 3-3
World Energy LLC’s Annual Ongoing Operations 2019-2024
Total Economic Impact
Los Angeles/Rest of California Multiregional Analysis

	2019	2020	2021	2022	2023	2024
Output (\$ mil)	\$608.1	\$824.6	\$1,010.8	\$990.9	\$1,132.4	\$2,415.8
Direct	361.7	494.6	612.8	677.2	774.4	1,618.3
Indirect & Induced	246.4	330.0	397.98	313.7	358.1	797.5
Value Added (\$ mil)	\$187.1	\$246.4	\$298.3	\$279.0	\$317.8	\$734.5
Direct	62.7	80.7	96.8	109.8	124.9	296.8
Indirect & Induced	124.4	165.7	201.5	169.2	192.9	437.7
Employment (jobs)*	1,360	1,760	2,120	1,830	2,080	5,360
Direct	350	410	490	530	610	1,870
Indirect & Induced	1,010	1,340	1,620	1,300	1,480	3,490
Labor Income (\$ mil)	\$102.0	\$133.1	\$160.7	\$147.6	\$167.46	\$403.98
Direct	28.3	35.3	42.4	51.0	57.8	150.5
Indirect & Induced	73.8	97.8	118.3	96.6	109.7	253.4
Total Fiscal Impacts (\$ mil)	\$42.4	\$55.5	\$67.6	\$64.6	\$73.5	\$165.4
State and Local Taxes	21.0	27.6	33.9	32.4	36.9	78.5
Federal Taxes	21.3	27.9	33.7	32.2	36.6	87.0

*May not sum due to rounding
 Source: World Energy; Estimates by LAEDC

with output, sees a similar increase by about six-fold from 2019 to 2024. Exhibit 3-2 displays the separation between value-added and output per the IMPLAN Group.

In addition to these gains seen in value added and output, employment and labor income are expected to grow rapidly over the next five years as well. Direct, indirect, and induced employment is expected to grow as the Paramount facility increases its green energy output. The employment impact is estimated to grow from about 1,360 jobs in 2019 to 5,360 jobs in 2024. The resulting labor income of these jobs will grow as well, from about \$102 million to almost \$404 million, a sum total of more than \$1.1 billion in labor income over the six-year period. The jobs created by World Energy's operations pay well above Los Angeles County's median wage. In 2019, these jobs paid on average approximately \$75,000 annually, over twice the median 2019 per capita income for the county². By 2024, the average wage of jobs impacted will rise slightly to \$75,380 (due to the far larger number of manufacturing and administrative support jobs supported), over twice the \$32,500 median per capita income in Los Angeles County. These employment impacts, as delineated in the exhibits, are both direct and indirect. It should be noted that direct employment is expected to pay on average \$59,600.³

The total fiscal impacts (state, local, and federal tax revenues) produced by World Energy's operations are expected to grow with the increased volume and profitability growth. The total fiscal impacts for 2019 were estimated at \$42 million. About 50 percent of these taxes and other fiscal impacts went to state and local governments while the remaining 50 percent went to the federal government. By 2024, these impacts are projected to grow to just over \$165 million. The ratio of state and local government income to federal government income is expected to remain about the same.

Exhibit 3-4 on the next page breaks out the employment impacts by industry. As expected, about one quarter of employment impacts are in the manufacturing industry. The manufacturing industry concerns all forms of chemical manufacturing, including biodiesel and non-petroleum fuels. Other prominent industries include retail trade, warehousing and transportation, health care and social assistance, and administrative and support and waste management and remediation services. While all industries listed above see significant impacts over the next few years, the administrative and support and waste management and remediation services industry sees a growth of impacts by ten times over the same period. Nearly every sector of the local economy is affected, with regards to employment, by World Energy's ongoing operations.

The employment impact is estimated to grow from over 1,300 jobs in 2019 to 5,360 jobs in 2024. The resulting labor income from these jobs will grow from \$102 million to almost \$404 million.

² American Community Survey 2019, 5-Year Estimates, United States Census Bureau

³ BLS QCEW 2019 Annual Estimates for Los Angeles County for NAICS 325199.

Exhibit 3-4

**World Energy LLC's Annual Ongoing Operations
Employment Impacts by Industry
Los Angeles/Rest of California Multiregional Analysis**

Total Impact	2019	2020	2021	2022	2023	2024
Ag, Forestry, Fish, & Hunting	30	43	54	3	4	7
Mining	60	60	58	40	39	84
Utilities	5	7	9	7	9	17
Construction	9	13	16	11	13	28
Manufacturing	303	381	478	459	540	1,178
Wholesale Trade	124	170	205	201	225	468
Retail Trade	68	91	111	92	105	238
Transportation & Warehousing	104	143	179	184	211	439
Information	48	54	47	48	53	111
Finance & Insurance	61	77	84	65	73	165
Real estate & Rental	45	55	70	60	67	159
Professional, Scientific, & Technical Services	90	112	132	102	113	287
Management of Companies & Enterprises	29	37	44	38	42	98
Administrative & Support & Waste Management & Remediation Services	110	162	192	139	157	1,089
Educational Services	13	17	21	17	19	46
Health Care & Social Assistance	75	97	117	97	111	267
Arts, Entertainment, & Recreation	14	18	22	18	20	49
Accommodation & Food Services	63	83	99	82	93	235
Other services (except Public Administration)	88	105	140	142	157	320
Government Enterprises	20	28	35	29	33	71
Total Employment Impacts:	1,360	1,760	2,120	1,830	2,080	5,360

Source: World Energy; Estimates by LAEDC

Similar to Exhibits 3-3 and 3-4 presented above, Exhibits 3-5 and 3-6 on the next page display the impact of World Energy’s ongoing operations on a national scale (excluding California). As these exhibits demonstrate, World Energy’s activities in Paramount are expected to result in significant impacts across the U.S. outside of California due to out-of-state and inter-industry linkages. LAEDC also recommends a global study of World Energy’s renewable fuels to understand the full impact of the operations at Paramount. In the context of global impact, the switch to biofuels by World Energy customers will also have environmentally beneficial ripple effects, as transportation fleets need to fuel elsewhere globally and drive more global demand and production of sustainable biofuels, in turn driving positive change.

Exhibit 3-5 shows the impacts broken down by type and level of directness in the rest of the United States. Just as in Exhibit 3-3, the economic impact relating to World Energy’s ongoing operations grows significantly from 2019 to 2024. Output grows from \$941 million in 2019 to an expected nearly \$4.6 billion in 2024. Value added increases from \$339 million to approximately \$1.6 billion in the same timeframe. Employment and labor income also increase, with an estimated 12,940 jobs supported in 2024 paying over \$1.6 billion in labor income. The average wage of these jobs is estimated to be over \$127,000. Fiscally, a similar trend is followed. The federal/non-federal tax split slightly favors the federal government by between 12 and 16 percent. It is estimated that in 2024 the fiscal impact of these operations will total over \$325.9 million.

Exhibit 3-5**World Energy LLC's Annual Ongoing Operations 2019-2024****Total Economic Impact
Rest of the United States**

	2019	2020	2021	2022	2023	2024
Output (\$ mil)	\$941.5	\$1,253.5	\$1,554.4	\$1,807.5	\$2,085.4	\$4,588.5
<i>Direct</i>	298.1	392.8	486.0	557.9	643.8	1,433.2
<i>Indirect & Induced</i>	643.4	860.7	1,068.3	1,249.5	1,441.6	3,155.3
Value Added (\$ mil)	\$339.9	\$444.7	\$549.27	\$629.1	\$726.0	\$1,652.2
<i>Direct</i>	62.4	76.4	92.9	100.3	115.3	289.3
<i>Indirect & Induced</i>	277.5	368.3	456.3	528.8	610.7	1,362.9
Employment (jobs)*	2,530	3,280	4,000	4,720	5,420	12,940
<i>Direct</i>	300	340	400	450	520	1,750
<i>Indirect & Induced</i>	2,230	2,940	3,600	4,270	4,900	11,190
Labor Income (\$ mil)	\$177.1	\$230.0	\$282.1	\$328.3	\$378.0	\$884.3
<i>Direct</i>	30.0	36.1	44.5	48.5	56.4	153.9
<i>Indirect & Induced</i>	147.1	193.9	237.6	279.8	321.5	730.4
Total Fiscal Impacts (\$ mil)	\$67.5	\$87.8	\$108.9	\$123.9	\$143.1	\$325.9
<i>State and Local Taxes</i>	29.5	38.4	48.0	53.5	62.0	137.1
<i>Federal Taxes</i>	38.0	49.5	60.8	70.35	81.1	188.9

*May not sum due to rounding
Source: World Energy; Estimates by LAEDC

The same trends appear when disaggregating the employment impact, as seen in Exhibit 3-6. The manufacturing industry is expected to see the largest increase in employment from 2019 to 2024 because of World Energy's ongoing Paramount operations. Proportionally, the administrative and support and waste management and remediation services industry sees the largest growth.

As with the California economy, World Energy affects nearly all reaches of the economy. As was mentioned in the Executive Summary, these expected positive job impacts are likely to occur in the context of an economy still recovering from the damaging economic consequences of the COVID-19 pandemic. Most of these estimated job gains are in industries that experienced less significant impacts; the effects modeled from World Energy's expanding operations do indicate modest job gains in severely impacted sectors such as retail trade and accommodation and food services

Exhibit 3-6**World Energy LLC's Annual Ongoing Expenditures
Employment Impacts by Industry
Rest of the U.S.**

	2019	2020	2021	2022	2023	2024
Ag, Forestry, Fish, & Hunting	299	412	497	648	731	1,521
Mining	73	82	92	91	101	211
Utilities	23	31	40	44	50	107
Construction	22	30	37	43	50	111
Manufacturing	378	468	582	680	805	1,883
Wholesale Trade	171	230	279	349	397	861
Retail Trade	150	198	244	282	326	749
Transportation & Warehousing	146	195	242	287	331	721
Information	72	85	84	98	112	251
Finance & Insurance	119	151	177	205	234	535
Real estate & Rental	123	159	195	235	268	605
Professional, Scientific, & Technical Services	152	194	236	266	306	734
Management of Companies & Enterprises	49	62	76	87	100	231
Administrative & Support & Waste Management & Remediation Services	186	257	314	354	409	1,613
Educational Services	30	39	48	56	64	150
Health Care & Social Assistance	174	226	277	322	371	868
Arts, Entertainment, & Recreation	39	50	62	72	83	195
Accommodation & Food Services	144	188	230	266	307	732
Other services (except Public Administration)	149	183	237	273	311	703
Government Enterprises	32	43	53	60	70	157
Total Employment Impacts*:	2,530	3,280	4,000	4,720	5,420	12,940

*May not sum due to rounding
Source: World Energy; Estimates by LAEDC

The positive jobs impacts from World Energy's expanded operations are likely to take place in the context of an economy still recovering from the deleterious economic impacts of the COVID-19 pandemic.

Section 4: World Energy Paramount Facility Capital Expenditures

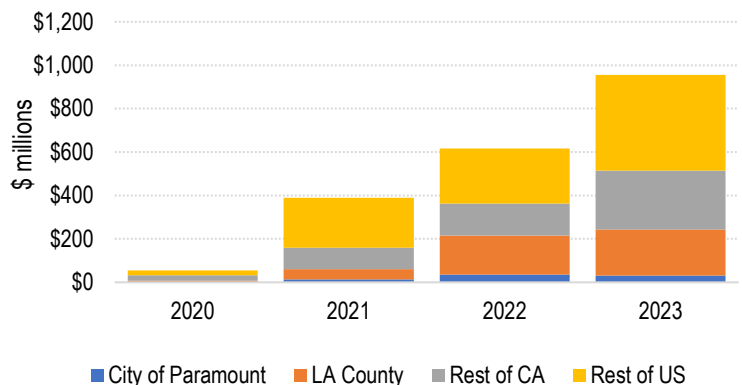
Under the Renewable Fuels Project, World Energy will repurpose, to the extent possible, existing refinery equipment at the Paramount facility, while undertaking several upgrades to improve efficiencies and reduce emissions. AltAir, which had been in partnership with Paramount Petroleum since 2013 in the conversion process of the Paramount refinery to renewable fuels production, was purchased by World Energy in 2018 as a wholly owned subsidiary; World Energy also purchased the Paramount refinery. World Energy intends the total conversion of the refinery to the manufacture of renewable fuels.



World Energy separated the planned investments in the Renewable Fuels Project into several categories: raw materials, process units, support units, utilities, and products and logistics. Details on each project:

- Raw Materials:** Make additional grades of feedstocks available, in addition to technical grade tallows and vegetable oil, including lower-grade fats, greases, and oils, such as used cooking oil. The Paramount facility will receive all raw materials by rail, truck, or shipped by water to the San Pedro Bay Ports, transferred to local tank storage, and then trucked to Paramount.
- Process Units:** Installation of a pretreatment unit for the use of lower-grade feedstocks and upgrade the existing Renewable Fuels Unit A to increase capacity and produce gases to feed the hydrogen plant. Installation of a new Renewable Fuels Unit B to increase production capacity and produce feed gases for the hydrogen unit. Modify the naphtha stabilizer to allow new propane recovery facilities and separate renewable propane and mixed butanes for market and facility use.
- Support Units:** Installation of a new hydrogen generation unit to reduce the need to transport hydrogen by truck. Repurpose existing pipelines for hydrogen transportation before completion of the onsite hydrogen plant. Installation of a new second flare and flare vapor recovery system, and a new hydrogen sulfide recovery unit to recover and reuse hydrogen.

Exhibit 4-1: World Energy Capital Expenditures by Region, 2020-2023



- **Wastewater Treatment:** Installation of a sour water unit and additional wastewater treatment facilities, a key element in the production process.
- **Utilities:** Installation of a new feed water retreatment unit with the hydrogen generation unity. Refurbish and repurpose two existing cooling towers to support the renewable fuels process.
- **Products and Logistics:** The Renewable Fuels Project will continue the production of renewable naphtha, SAF, and renewable diesel in addition to propane, butane, and pentane to be used as gasoline blend components or products. Modifications to the project that will support the renewable fuels operation include: existing product storage tank permits, truck loading and unloading facilities, and existing rail and unloading facilities for the inputs and products.

World Energy’s capital investment spending at the Paramount Project between 2020 and 2023 will be \$2.0 billion in the United States. Of these expenditures, \$81 million will be in the City of Paramount. Another 22.1 percent of those expenditures, or \$445 million, are expected to be in LA County. During the three years of projected investments directly in the City of Paramount, the Renewable Fuels Project is estimated to generate \$106.3 million in new output, almost \$46.3 million in new labor income, and \$11.7 million in federal, state, and local taxes. An annual average of 200 additional jobs is estimated to be sustained in the city over the project’s lifetime. Exhibit 4-2 provides a summary of impacts by year for the City of Paramount.

Exhibit 4-2
World Energy LLC's Capital Expenditures 2020-2023
Total Economic Impact
City of Paramount

	2021	2022	2023
Output (\$ mil)	20.0	46.1	40.2
<i>Direct</i>	11.8	28.1	24.8
<i>Indirect & Induced</i>	8.2	18.0	15.4
Value Added (\$ mil)	12.2	27.9	24.4
<i>Direct</i>	7.2	16.9	15.0
<i>Indirect & Induced</i>	5.0	11.0	9.4
Employment (jobs)	100	260	230
<i>Direct</i>	60	170	150
<i>Indirect & Induced</i>	40	90	80
Labor Income (\$ mil)	8.9	20.1	17.3
<i>Direct</i>	5.9	13.6	11.7
<i>Indirect & Induced</i>	3.0	6.5	5.6
Total Fiscal Impacts (\$ mil)	2.1	5.1	4.5
<i>State and Local Taxes</i>	0.7	1.9	1.7
<i>Federal Taxes</i>	1.4	3.2	2.8

Source: World Energy; Estimates by LAEDC

During the three years of projected investments directly in the City of Paramount, the Renewable Fuels Project is estimated to generate \$106.3 million in new output, almost \$46.3 million in new labor income, and \$11.7 million in federal, state, and local taxes.

Given the City of Paramount's relatively small population, LAEDC does not expect a numerically large employment impact locally. Employment impacts from capital expenditures are predicted to be almost exclusively in construction, which pays an average of \$69,921 across the industry in Los Angeles County, and professional, scientific, and technical services, which pays an average of \$110,825 across the industry in Los Angeles.⁴ By comparison, the average wage for all workers in the City of Paramount was estimated to be \$41,762 in 2019.⁵ It should be noted that employment impacts in Exhibit 4-3 will not be World Energy jobs but rather the result of World Energy spending.

Over the four years of capital investment, through multiplier effects, these expenditures are estimated to generate more than \$663.3 million in new output for LA County, \$369.3 million in value-added (gross county product or GCP), over \$246.1 million in labor income, and \$77.7 million in federal, state, and local taxes. Exhibit 4-4 provides a summary breakout of impacts by year.

In Los Angeles County, World Energy's capital expenditures are expected to create an annual average of 1,040 jobs, direct, indirect, and induced, with the preponderance of those jobs in construction. In 2021, over a quarter of jobs created are expected to be in professional, scientific, and business services, likely due to the expected \$55

Exhibit 4-3**World Energy LLC's Capital Expenditures
Disaggregation of Employment Impacts by Industry
City of Paramount**

	2021	2022	2023
Ag, Forestry, Fish, & Hunting	-	-	-
Mining	-	-	-
Utilities	-	-	-
Construction	32	117	109
Manufacturing	-	1	1
Wholesale Trade	5	13	12
Retail Trade	3	7	6
Transportation & Warehousing	3	8	7
Information	1	2	2
Finance & Insurance	2	5	4
Real estate & Rental	6	20	22
Professional, Scientific, & Technical Services	31	35	23
Management of Companies & Enterprises	1	2	2
Administrative & Support & Waste Management & Remediation Services	7	13	10
Educational Services	1	2	2
Health Care & Social Assistance	5	11	9
Arts, Entertainment, & Recreation	1	2	1
Accommodation & Food Services	4	9	7
Other services (except Public Administration)	4	9	8
Government Enterprises	3	3	1
Total Employment Impacts*:	100	260	230

*May not sum due to rounding
Source: World Energy; Estimates by LAEDC;

Exhibit 4-4**Economic Impact of World Energy LLC's Capital Expenditures 2020-2023****Total Economic Impact
Rest of Los Angeles County**

	2020	2021	2022	2023
Output (\$ mil)	12.9	74.8	268.8	306.8
<i>Direct</i>	7.1	42.4	162.5	183.7
<i>Indirect & Induced</i>	5.8	32.3	106.3	123.1
Value Added (\$ mil)	7.9	43.9	145.5	171.9
<i>Direct</i>	4.4	24.1	81.2	97.4
<i>Indirect & Induced</i>	3.6	19.8	64.3	74.6
Employment (jobs)	60	380	1,320	1,580
<i>Direct</i>	30	200	750	920
<i>Indirect & Induced</i>	30	180	570	660
Labor Income (\$ mil)	5.5	31.0	95.9	113.7
<i>Direct</i>	3.3	18.8	56.9	68.3
<i>Indirect & Induced</i>	2.2	12.2	39.0	45.4
Total Fiscal Impacts (\$ mil)	2.5	8.9	30.2	36.1
<i>State and Local Taxes</i>	1.4	2.9	11.6	14.0
<i>Federal Taxes</i>	1.1	6.0	18.6	22.1

Source: World Energy; Estimates by LAEDC

⁴ 2019 Quarterly Census of Employment and Wages, Annual Averages. U.S. Bureau of Labor Statistics.

⁵ American Communities Survey 2019 5-Year estimates. U.S. Department of the Census.

million in architectural and engineering services. Some of the estimated jobs will not be net new jobs but rather jobs retained from year to year. However, this implies that these households will benefit from job stability from year to year even if no net new jobs are created. Exhibit 4-5 provides a full accounting of job creation in LA County due to the World Energy capital expenditures.

Over the Renewable Fuels Project’s lifetime, an estimated \$543 million, or 26.9 percent, is expected to be spent in California outside of LA County. Construction, architectural, and engineering services will account for the majority of these expenses. Between 2020 and 2023, these investments are estimated to generate almost \$882 million in output, \$503.2 million in value-added, more than \$344.1 million in labor income, and more than \$105.9 million in federal, state, and local taxes. Exhibit 4-6 provides a full accounting of these impacts.

Across the lifetime of the project, an annual average of 1,090 direct, indirect, and induced jobs are estimated to be created. Between 44 and 56 percent of these jobs are expected to either be in construction or professional, scientific, and technical services, including architectural and engineering firms.

Again, between years some of these jobs may not be net new jobs but jobs maintained from year to year.

Exhibit 4-5

**World Energy LLC's Capital Expenditures
Disaggregation of Employment Impacts by Industry
Rest of Los Angeles County**

	2020	2021	2022	2023
Ag, Forestry, Fish, & Hunting	-	-	-	-
Mining	-	-	1	1
Utilities	-	-	1	1
Construction	1	77	536	669
Manufacturing	-	21	97	126
Wholesale Trade	1	14	71	90
Retail Trade	3	14	47	51
Transportation & Warehousing	2	11	41	50
Information	1	4	11	13
Finance & Insurance	2	9	28	33
Real estate & Rental	2	17	102	149
Professional, Scientific, & Technical Services	28	118	103	63
Management of Companies & Enterprises	1	4	14	15
Administrative & Support & Waste Management & Remediation Services	6	29	70	82
Educational Services	1	4	11	14
Health Care & Social Assistance	4	21	66	78
Arts, Entertainment, & Recreation	1	3	10	12
Accommodation & Food Services	4	18	50	58
Other services (except Public Administration)	3	16	53	64
Government Enterprises	5	7	7	8
Total Employment Impacts*	60	380	1,320	1,580

*May not sum due to rounding
Source: World Energy; Estimates by LAEDC;

Exhibit 4-6

**Economic Impact of World Energy LLC's Capital Expenditures 2020-2023
Total Economic Impact
California (Excluding Los Angeles County)**

	2020	2021	2022	2023
Output (\$ mil)	48.7	190.5	231.7	411.0
<i>Direct</i>	25.5	102.0	129.7	231.0
<i>Indirect & Induced</i>	23.1	88.5	102.0	179.9
Value Added (\$ mil)	30.5	113.3	131.3	228.0
<i>Direct</i>	16.0	58.8	70.2	121.0
<i>Indirect & Induced</i>	14.5	54.5	61.1	107.0
Employment (jobs)	240	940	1,150	2,040
<i>Direct</i>	110	460	620	1,130
<i>Indirect & Induced</i>	130	480	530	910
Labor Income (\$ mil)	21.9	80.9	88.1	153.1
<i>Direct</i>	13.0	47.8	51.5	89.5
<i>Indirect & Induced</i>	8.9	33.1	36.6	63.7
Total Fiscal Impacts (\$ mil)	6.3	23.5	27.8	48.3
<i>State and Local Taxes</i>	2.0	7.6	10.3	18.1
<i>Federal Taxes</i>	4.3	15.8	17.4	30.3

Source: World Energy; Estimates by LAEDC

Exhibit 4-7 provides full accounting of the expected job impacts due to World Energy’s capital expenditures in California outside Los Angeles County.

Finally, project expenditures across the U.S., beyond California, are expected to be almost \$947 million, or 47 percent of the project totals, over the Renewable Fuels Project’s lifetime. Between 2020 and 2023, World Energy’s capital expenditures are expected to create \$2.5 billion in new output, over \$1.2 billion in value-added (GDP), \$817.3 million in labor income, and \$257.9 million in federal, state, and local taxes.

Exhibit 4-8 provides a full accounting of the economic impacts attributed to World Energy capital expenditures in the U.S. outside California.

The three years of capital expenditures are expected to create an annual average of 2,980 direct, indirect, and induced jobs. Again, some of these jobs may not be new but persistent employment over the life of the project. Unlike LA County and California, a significant number of these jobs, especially in 2021 and 2023, are estimated to be in manufacturing. This is likely due to the significant expenditure expected for construction materials, compressors, vessels, pumps, centrifuges, reactors, exchangers,

Exhibit 4-7

**World Energy LLC's Capital Expenditures
Disaggregation of Employment Impacts by Industry
California (Excluding Los Angeles County)**

	2020	2021	2022	2023
Ag, Forestry, Fish, & Hunting	-	2	2	3
Mining	-	1	2	3
Utilities	-	1	1	2
Construction	1	91	388	782
Manufacturing	2	78	129	281
Wholesale Trade	3	17	63	110
Retail Trade	11	41	45	78
Transportation & Warehousing	5	22	33	62
Information	2	7	8	13
Finance & Insurance	7	25	28	49
Real estate & Rental	7	26	75	115
Professional, Scientific, & Technical Services	133	382	120	108
Management of Companies & Enterprises	2	9	10	18
Administrative & Support & Waste Management & Remediation Services	22	77	66	111
Educational Services	2	9	10	17
Health Care & Social Assistance	14	52	57	99
Arts, Entertainment, & Recreation	3	11	12	20
Accommodation & Food Services	15	53	49	83
Other services (except Public Administration)	10	37	44	75
Government Enterprises	1	6	7	12
Total Employment Impacts*	240	940	1,150	2,040

Source: World Energy; Estimates by LAEDC; *May not sum to summary estimates due to rounding

Exhibit 4-8

**World Energy LLC's Capital Expenditures 2020-2023
Total Economic Impact
Rest of United States**

	2020	2021	2022	2023
Output (\$ mil)	60.0	630.6	695.1	1,161.3
<i>Direct</i>	22.4	234.1	253.1	416.3
<i>Indirect & Induced</i>	37.6	396.5	442.0	745.0
Value Added (\$ mil)	31.3	304.8	340.5	576.9
<i>Direct</i>	11.2	100.8	112.8	191.2
<i>Indirect & Induced</i>	20.0	204.0	227.7	385.7
Employment (jobs)	280	2,640	3,220	5,740
<i>Direct</i>	90	820	1,150	2,200
<i>Indirect & Induced</i>	190	1,820	2,070	3,540
Labor Income (\$ mil)	20.2	188.5	221.2	387.4
<i>Direct</i>	8.2	66.8	86.3	159.6
<i>Indirect & Induced</i>	12.1	121.6	135.0	227.8
Total Fiscal Impact	6.3	60.8	69.8	120.9
<i>State and Local Taxes</i>	2.1	21.2	24.1	41.7
<i>Federal Taxes</i>	4.2	39.6	45.7	79.2

Source: World Energy; Estimates by LAEDC

and heaters. For those years, just over 800 and 1,100 of estimated jobs impacts are expected to be in manufacturing, respectively.

Exhibit 4-9 provides a full breakout of the remaining jobs impacts.

Exhibit 4-9
Distribution of World Energy LLC's Capital Expenditure's Employment Impact by Industry
Disaggregation of Employment Impacts by Industry
Rest of the United States

	2020	2021	2022	2023
Ag, Forestry, Fish, & Hunting	2	22	26	46
Mining	1	11	16	31
Utilities	1	9	10	16
Construction	1	192	596	1,430
Manufacturing	56	817	810	1,189
Wholesale Trade	9	119	128	228
Retail Trade	15	145	164	285
Transportation & Warehousing	9	103	121	214
Information	3	32	35	60
Finance & Insurance	11	106	116	196
Real estate & Rental	10	86	104	189
Professional, Scientific, & Technical Services	67	220	188	293
Management of Companies & Enterprises	6	62	53	71
Administrative & Support & Waste Management & Remediation Services	21	169	214	384
Educational Services	3	31	37	65
Health Care & Social Assistance	20	186	218	381
Arts, Entertainment, & Recreation	4	40	46	79
Accommodation & Food Services	18	152	173	298
Other services (except Public Administration)	13	121	141	247
Government Enterprises	2	21	23	39
Total Employment Impacts*	280	2,640	3,220	5,740

Source: World Energy; Estimates by LAEDC; *May not sum due to rounding

Section 5: World Energy Job Creation

Workforce Implications

LAEDC matched job titles of existing World Energy workers to standard occupations, typical education attainment levels, and job projections in Los Angeles County, with the goal of demonstrating a local supply of qualified workers ready for hire as World Energy expands its local operations. The Bureau of Labor Statistics assigns job positions and titles to standard occupations and groups according to similar job duties. This analysis examines 52 unique World Energy job titles and relates them to federally collected information for similar occupations for context and perspective.

The greatest number of unique job titles are in the Production occupations group. This group generally requires no postsecondary education for employment. The next largest group is Management occupations with 12 unique jobs, all requiring at least a bachelor's degree for employment.

Although job projections are currently subject to unprecedented impacts of the COVID-19 pandemic, this section includes a future look at employment numbers. By the year 2026, there will be a forecasted 306,550 jobs in Los Angeles County for occupations related to the 52 World Energy job titles. Some occupations are expected to experience job loss, but the majority will add new jobs.

Community colleges and four-year universities in the surrounding area offer several programs related to jobs in this analysis. At the community colleges (Cerritos, Compton, Long Beach, Rio Hondo), training is available for accounting, machine tool operation, administrative assistant, computer information systems, engineering technology, and logistics management. At California State University, Long Beach, the Engineering program offers bachelor's degrees in chemical engineering, civil engineering, electrical engineering, and mechanical engineering. The university also provides education for degrees in accountancy, human resources, information systems, and marketing. Therefore, the region's workforce development systems are aligned with the occupational opportunities at World Energy which is a foundation for local hiring from the region, which supports opportunity for local residents.

Management Occupations

Exhibit 5-1

Management occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net ⁶ Ed Req	World Energy Ed Req
Chief Executives (11-1011)	Chief Commercial Officer	Master's	Bachelor's
Public Relations and Fundraising Managers (11-2031)	Director, Government and Community Relations	Bachelor's	Bachelor's
Logistics Managers (11-3071.03)	Gen Manager Plan Econ & Logistics	Bachelor's	Bachelor's Engineering
	Manager, Logistics & Scheduling	Bachelor's	Bachelor's Engineering
Human Resources Manager (11-3121.00)	Manager, Human Resources	Bachelor's	Bachelor's Engineering
	Sr Engineering Advisor	Bachelor's	Bachelor's Engineering
	Sr Environmental Engineer	Bachelor's	Bachelor's Engineering
	Sr Inspection Engineer	Bachelor's	Bachelor's Engineering
	Sr Process Engineer	Bachelor's	Bachelor's Engineering
Architectural and Engineering Managers (11-9041.00)	Sr Instrumentation and Controls Engineer	Bachelor's	Bachelor's Engineering
	Director, Engineering and Technology Services	Bachelor's	Bachelor's Engineering
	Compliance Manager (11-9199.02)	Manager, Environmental Compliance	Bachelor's

There are currently 12 positions categorized as Management occupations. World Energy requires a bachelor's degree for all Management occupations; 10 of the 12 require a bachelor's in engineering. According to information collected from incumbent workers, all but one occupation reports a bachelor's

Exhibit 5-2

Management occupations: Jobs projection in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
11-1011	Chief Executives	10,610	10,300
11-2031	Public Relations and Fundraising Managers	1,950	2,210
11-3071.03	Logistics Managers	5,230	5,790
11-3121.00	Human Resources Manager	3,950	4,370
11-9041.00	Architectural and Engineering Managers	5,140	5,230
11-9199.02	Compliance Manager	25,430	27,700
Total		52,310	55,600

degree as the typical education. Chief Executives generally possess a master's degree. According to employment projections, this cluster of Management occupations will increase by 3,290 jobs by 2026.

Business and Financial Operations Occupations

Exhibit 5-3

Business and Financial Operations occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Purchasing Agents (13-1023.00)	Purchasing/Warehouse II	Bachelor's	High School +
Marketing Research Analyst and Marketing Specialist (13-1161.00)	Marketing Communications Specialist	Bachelor's	Bachelor's
Accountant (13-2011.01)	Accounting Supervisor	Bachelor's	Bachelor's Accounting
	Staff Accountant	Bachelor's	Bachelor's Accounting

Among World Energy workers, four positions are categorized as Business and Financial Operations occupations. The typical education attained by existing workers is a bachelor's degree. The education level required by World Energy varies, with one

Exhibit 5-4

Business and Financial Operations occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
13-1023.00	Purchasing Agents	8,500	7,860
13-1161.00	Marketing Research Analyst and Marketing Specialist	24,000	29,950
13-2011.01	Accountant	47,520	51,760
Total		80,020	89,570

⁶ O*Net Online Career Exploration and Job Analysis Tool. Employment and Training Administration, U.S. Department of Labor.

position requiring a high school education, two requiring accounting degrees, and one an unspecified bachelor’s degree. In Los Angeles County, this cluster of occupations is forecasted to add 9,550 jobs by 2026.

Computer and Mathematical Operations Occupations

Exhibit 5-5
Computer and Mathematical occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Information Technology Project Managers (15-1199.09)	Director, Technology	Bachelor's	Bachelor's
Computer Systems Analyst (15-1121)	Systems Analyst	Bachelor's	High School +

The existing World Energy workforce counts two positions in the Computer and Mathematical occupations category. The typical education attained by workers in these positions is a bachelor’s degree. World Energy requires high school completion for a systems analyst and a bachelor’s degree for a technology director. In Los Angeles County, there are more than twice as many current and forecasted jobs for computer systems analyst as compared to information technology project managers. By the year 2026, there are expected to be 2,040 new jobs for the two occupations in this cluster.

Exhibit 5-6
Computer and Mathematical occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
15-1121	Computer Systems Analyst	14,720	16,130
15-1199.09	Information Technology Project Managers	6,870	7,500
Total		21,590	23,630

Architecture and Engineering Occupations

Exhibit 5-7
Architecture and Engineering occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Chemical Engineers (17-2041)	Process Engineer, Projects	Bachelor's	Bachelor's Engineering
Electrical Engineers (17-2071)	Electrical Engineer, Projects	Bachelor's	Bachelor's Engineering
	Reliability Engineer	Bachelor's	Bachelor's Engineering
Environmental Engineers (17-2081)	Environmental Compliance Engineer	Bachelor's	Bachelor's Engineering
Water/Wastewater Engineers ((17-2081.01)	Process & Wastewater Compliance Engineer	Bachelor's	Bachelor's Engineering
Industrial Safety and health Engineers (17-2111.01)	Safety Director	Bachelor's	Bachelor's
Mechanical Engineers (17-2141.00)	Mechanical Engineer, Projects	Bachelor's	Bachelor's Engineering
Non-destructive Testing Specialists (17-3029.01)	Pipeline Integrity Specialist I	High School	High School +

There are currently eight positions in the World Energy workforce classified as architecture and engineering occupations. The typical education attainment level for these occupations matches World Energy’s education requirements. One occupation requires a high school education and the remaining positions require a bachelor’s degree. Seven of the eight bachelor’s level positions specify a degree in engineering.

Exhibit 5-8
Architecture and Engineering occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
17-2041	Chemical Engineers	280	290
17-2071	Electrical Engineers	5,140	5,340
17-2081	Environmental Engineers	1,350	1,410
17-2081.01	Water/Wastewater Engineers	1,350 ⁷	1,410
17-2111.01	Industrial Safety and health Engineers	850	890
17-2141.00	Mechanical Engineers	6,380	6,600
17-3029.01	Non-destructive Testing Specialists	1,900	2,000
Total		19,000	19,860

⁷ Duplicated count of jobs for an emerging occupation within the established occupation.

Five of the positions are related to emerging occupations, according to the Bureau of Labor Statistics. This cluster of occupations is projected to add 860 jobs in Los Angeles County by the year 2026.

Life, Physical, and Social Science Occupations

Exhibit 5-9

Life, Physical, and Social Science occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Chemists (19-2031)	Chemist	Bachelor's	High School +
Chemical Technicians 19-4031)	Lab Technician	Associate's	High School +

World Energy lists two positions in the existing workforce that align with life, physical, and social science occupations. These occupations require a high school education for employment with World Energy, while existing workers report holding a bachelor's degree for chemists and an associate degree for chemical technicians. In Los Angeles County, this group of occupations will expect 340 new jobs.

Exhibit 5-10

Life, Physical, and Social Science occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
19-2031	Chemists	2,070	2,290
19-4031	Chemical Technicians	1,640	1,760
Total		3,710	4,050

Healthcare Practitioners and Technical Occupations

Exhibit 5-11

Healthcare Practitioners and Technical occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Occupational Health and Safety Specialists (29-9011.00)	Safety & Training Specialist	Bachelor's	High School +
Occupational Health and Safety Technicians (29-9012.00)	Safety Technician	Bachelor's	High School +

In the health care practitioners and technical occupations group, there are two job titles in the existing workforce. Both require a high school education for employment with World Energy, while incumbent workers report holding bachelor's degrees. Job growth in Los Angeles County for this cluster of occupations counts 150 new jobs by 2026.

Exhibit 5-12

Healthcare Practitioners and Technical occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
29-9011.00	Occupational Health and Safety Specialists	1,380	1,490
29-9012.00	Occupational Health and Safety Technicians	260	300
Total		1,640	1,790

Office and Administrative Support Occupations

Exhibit 5-13

Office and Administrative Support occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Bookkeeping, Accounting and Auditing Clerks (43-3031.00)	Accounts Payable Accountant	High School	Bachelor's Accounting
Weighers, Measurers, Checkers, and Samplers, Recordkeeping (43-5111.00)	Scale House Attendant	High School	High School +
Executive Secretaries and Executive Administrative Assistants (43-6011.00)	Administrative Assistant III	Associate's	High School +
	Executive Assistant/Office Manager	Associate's	High School +

There are four office and administrative support occupations in the World Energy workforce with a wide range of job types. Three of the four positions require a high school education and one requires a bachelor’s degree in accounting. Reported educational attainment levels differ from those desired by World Energy for employment. In aggregate, this cluster of occupations expects to experience a loss of 4,520 jobs by 2026.

Exhibit 5-14
Office and Administrative Support occupations: Jobs projection in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
43-3031.00	Bookkeeping, Accounting and Auditing Clerks	57,990	57,310
43-5111.00	Weighers, Measurers, Checkers & Samplers, Recordkeeping	3,720	3,760
43-6011.00	Executive Secretaries & Executive Administrative Assistants	26,330	22,450
Total		88,040	83,520

Construction and Extraction Occupations

Exhibit 5-15
Construction and Extraction occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
Plumbers, Pipefitters, and Steamfitters (47-2152)	Craftsman B PAR LB	Postsecondary Certificate	High School +
	Craftsman D PAR LB	Postsecondary Certificate	High School +

World Energy reports two very similar job titles related to plumbers, pipefitters, and steamfitters in the construction and extraction occupations group. The education requirement and typically held education levels are not the same, according to reported data. Los Angeles County will expect 1,880 new jobs for this position during the next several years.

Exhibit 5-16
Construction and Extraction occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
47-2152	Plumbers, Pipefitters, and Steamfitters	9,870	11,750

Production Occupations

Exhibit 5-17
Production occupations: Education requirement

Detailed Occupation (SOC Code)	World Energy Job Title	O*Net Ed Req	World Energy Ed Req
First-Line Supervisors of Production and Operating Workers (51-1011.00)	Shift Supervisor	High School	High School +
	Area Manager	High School	High School +
	Head Operator PAR & LB	High School	High School +
	Instrument Tech Lead	High School	High School +
	Laboratory Manager Control Lab	High School	BA - Engineering
	Lead Craftsman PAR LB	High School	High School +
	Maintenance Manager	High School	BA - Engineering
	Manager, Pipelines Compliance & Lkwd	High School	Bachelor’s Engineering
	Manager, Scale House & Rail Logistics	High School	Bachelor’s
	Mechanic Lead	High School	High School +
Petroleum Pump System Operators, Facility Operators, and Gaugers (51-8093)	Operator 8 Combo Operator	High School	High School +
	Operator A PAR & LB	High School	High School +
	Operator B PAR & LB	High School	High School +
	Operator C PAR & LB	High School	High School +
	Operator C PAR & LB	High School	High School +
	Operator D	High School	High School +

The most reported job titles within the World Energy workforce are in the Production occupations group with 16 positions. Twelve of the 16 positions require a high school education for employment with World

Energy, while all have reported only a high school diploma. There is a disparity in education levels for laboratory manager control lab, maintenance manager,

manager of pipelines compliance, and manager of Scale House & Rail Logistics. This cluster of occupations will also realize a loss of 820 jobs in LA County by 2026.

Exhibit 5-18

Production occupations: Jobs projections in LA County

SOC Code	Occupation	2016 jobs	2026 jobs
51-1011.00	First-Line Supervisors of Production and Operating Workers	16,070	15,300
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	1,530	1,480
	Total	17,600	16,780

Section 6: World Energy's Role in Achieving Climate and Environmental Goals

California has set the national standard for climate and emissions-related goals from the present to 2050. State and regional governments and regulators have identified the need to embrace a wide variety of low-emission (mainly carbon) and net zero emission solutions to meet those goals. World Energy's portfolio of low-carbon and renewable fuels and energy solutions are available now to help regional stakeholders achieve a present and future of cleaner air, healthier communities, and climate sustainability. As World Energy's volume of low carbon products increases, those sustainable fuels will be essential for the implementation of state and regional governments' plans for achieving climate and environmental goals.

Defining Environmental Justice

Southern California residents, susceptible receptors such as seniors, children, and adults with asthma and other respiratory issues, are confronted with adverse health threats associated with air pollution and climate change. These health concerns are particularly acute for environmental justice communities often exposed to disproportionately higher levels of air pollution and other environmental burdens, as well as associated economic impacts. Various regional and state plans have been adopted to address these climate, environmental, and economic challenges. World Energy's low-carbon fuels are an essential component to fully implementing these plans and realizing their benefits.

In 2012, the California State Legislature passed Senate Bill 535 (SB 535), which allocated 25 percent of the Greenhouse Gas Reduction Fund to projects targeting disadvantaged communities. SB 535 assigned the California Environmental Protection Agency (CalEPA) the responsibility of identifying these communities.⁸ CalEPA uses the CalEnviroScreen (CES), a mapping tool that pinpoints environmentally vulnerable communities through a mixture of environmental, health, and socioeconomic information by census tract, to target these projects.⁹ Higher scores indicate greater disadvantage under the criteria used by CalEPA in the CES analysis. As the map on the next page demonstrates, a significant portion of urban Southern California, especially a swath of Los Angeles County from the Tri-Cities to the Southeast area, is considered in the most vulnerable category under this assessment tool.

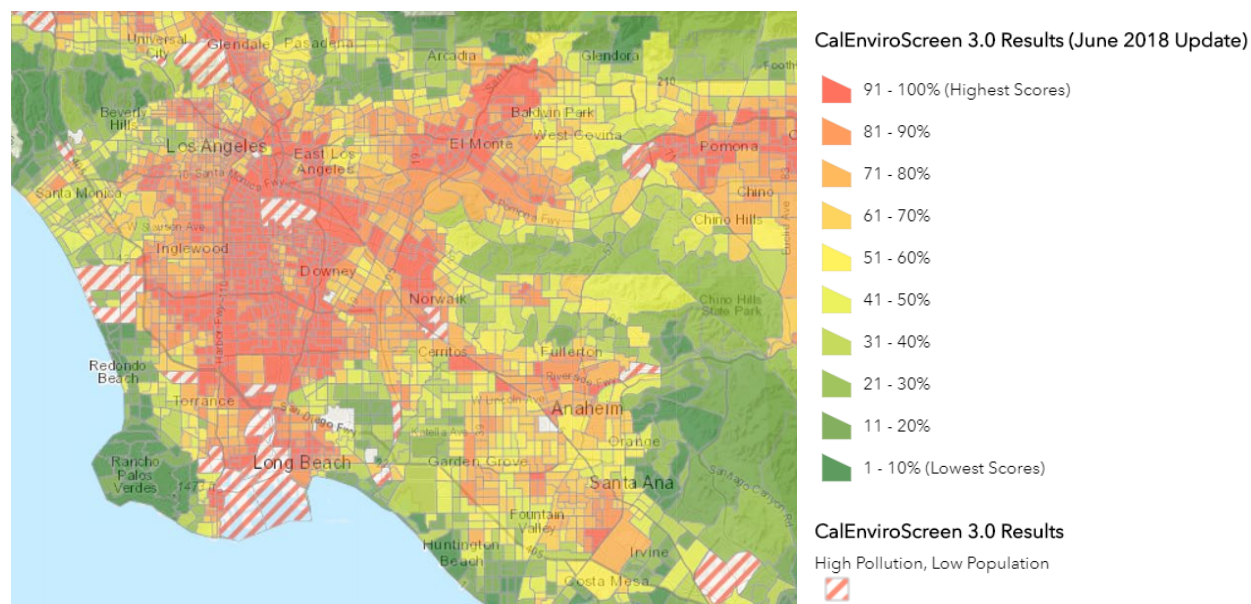
For both the state and the region, policies focused on emissions and air quality also fall under the heading of environmental justice, defined by the South Coast Air Quality Management District (SCAQMD) as "equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."¹⁰ Under California Assembly Bill 617, SCAQMD created its Community Air Monitoring program to identify acutely impacted communities; monitor

⁸ "Disadvantaged Community Designation." SB 535 Disadvantaged Communities. California Office of Health Hazard Assessment.

⁹ "What is CalEnviroScreen?" About CalEnviroScreen. California Office of Health Hazard Assessment.

¹⁰ "South Coast AQMD's Environmental Justice Program." Environmental Justice. South Coast Air Quality Management District.

Exhibit 6-1: Capture of CalEnviroScreen 3.0, California Office of Environmental Health Hazard Assessment



and identify the pollutants most severely impacting each identified community; and collaborate with community stakeholders to establish and implement a community emissions reduction plan.¹¹

The communities identified in 2018, 2019, and 2020 for Years 1, 2, and 3 of AB 617’s implementation are the following:

- East Los Angeles, Boyle Heights, West Commerce;
- Wilmington, Carson, West Long Beach;
- San Bernardino, Muscoy;
- Southeast Los Angeles;
- Eastern Coachella Valley; and
- South Los Angeles¹²

The Multiple Air Toxics Exposure Study (MATES) IV informed the prioritization.

¹¹ “Cleaning the Air in the Most Impacted Communities.” Technical Workshop. South Coast Air Quality Management District. 8 June 2018.

¹² “Data Sources and Methodology for Community Prioritization.” Final Submittal from South Coast AQMD: Year 2 Community Recommendations for AB 617 Implementation. South Coast Air Quality Management District.

As the map at right demonstrates, the communities identified as most vulnerable in the MATES IV overlap with those identified as Year 1 communities.

The MATES IV identified particulate matter from diesel emissions as contributing the majority (68.2 percent) of the identified air toxics risk in the South Coast Air Basin.

In the City of Paramount, home to World Energy’s Southern California operations, eight out of 11 census tracts are in the top decile of CES scores. They are within at least one of the Year 1 AB 617 communities identified by SCAQMD. In Los Angeles County, generally, 38 percent of residents live in census tracts in the top decile of CES, and more than 71 percent live in census tracts receiving CES scores in the top half of CES scores. As a stakeholder in the City of Paramount and Southeast Los Angeles County, World Energy is committed to ensuring its neighboring communities benefit from the environmental and economic advantages of its product lines.

World Energy’s advanced renewable fuel products, as well as its future production and distribution of hydrogen fuel, can contribute toward community air and health objectives, in addition to providing solutions for achieving state and regional environmental goals. Since both renewable diesel and SAF provide “drop-in” alternatives for higher-polluting diesel and jet engine fuels, the increased production, delivery, and consumption of these alternative fuels offer immediate environmental justice benefits in Southern California.

The following sections describe environmental and transportation plans undertaken by regional planning and regulatory authorities to meet local, state, and federal emissions and climate change-related goals.

- The first element of this section details regional ambitions for emissions reductions.
- The second, third, and fourth element of this section connect two other key regional plans aimed at both reducing emissions and greening the region’s transportation networks in the continued fight against climate change.
- The fifth element of this section presents the fiscal risks of nonattainment of the goals set out in the three major regional environmental plans.

Exhibit 6-2: Capture of MATES IV Estimated Risk, SCAQMD

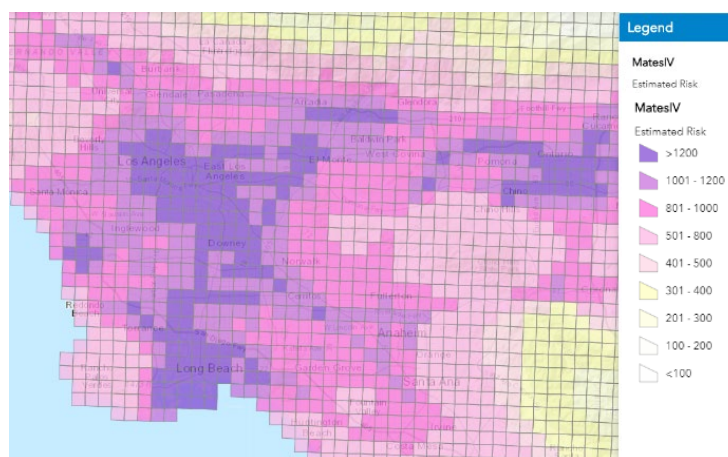
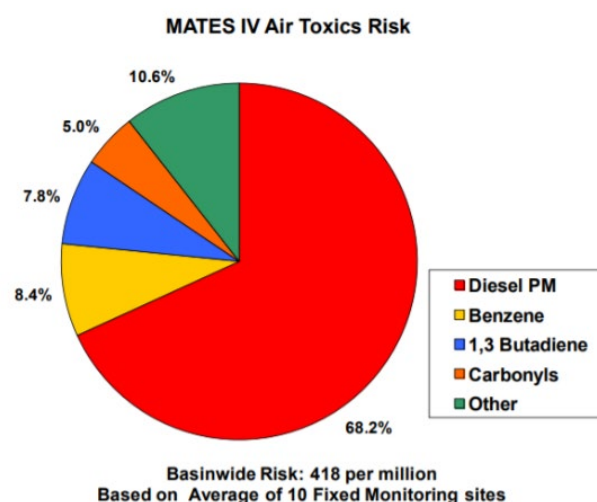


Exhibit 6-3: MATES-IV Air Toxics Risk



Source: Figure ES-2 “Average Risk from Monitoring Sites,” from MATES-IV Final Report, SCAQMD, May 2015

- Finally, a brief section covers the Governor of California’s Zero Emission Vehicle Mandate and is followed by a conclusion.

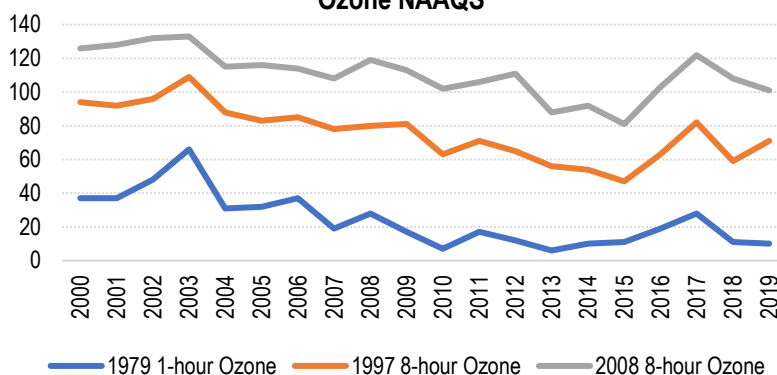
SCAQMD Air Quality Management Plan

SCAQMD is responsible for regulating and enforcing of state and federal air quality standards established by the federal Clean Air Act and California Clean Air Act for all of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino counties. Per the Clean Air Act, regions not attaining national ambient air quality standards (NAAQS) must develop and execute an emission reduction plan to bring the jurisdiction area into federal compliance within an allotted period. Pollutant volumes are measured either in parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Under its 2016 Air Quality Management Plan (AQMP), SCAQMD is responsible for attaining five standards by various dates. The latest attainment year is 2031 being for the eight-hour ozone standard last revised in 2008. The standards targeted for attainment for the AQMP are given in Exhibit 6-4.

Exhibit 6-4
Emissions Targets, 2016 SCAQMD AQMP

Standard	Concentration	Classification	Latest Attainment Year
2008 8-hour Ozone	75 ppb	Extreme	2031
2012 Annual PM2.5	12 $\mu\text{g}/\text{m}^3$	Moderate	2021
		Serious	2025
2006 24-hour PM2.5	35 $\mu\text{g}/\text{m}^3$	Serious	2019
1997 8-hour Ozone	80 ppb	Extreme	2023
1979 1-hour Ozone	120 ppb	Extreme	2022

Exhibit 6-5: SCAQMD Nonattainment Days by Ozone NAAQS

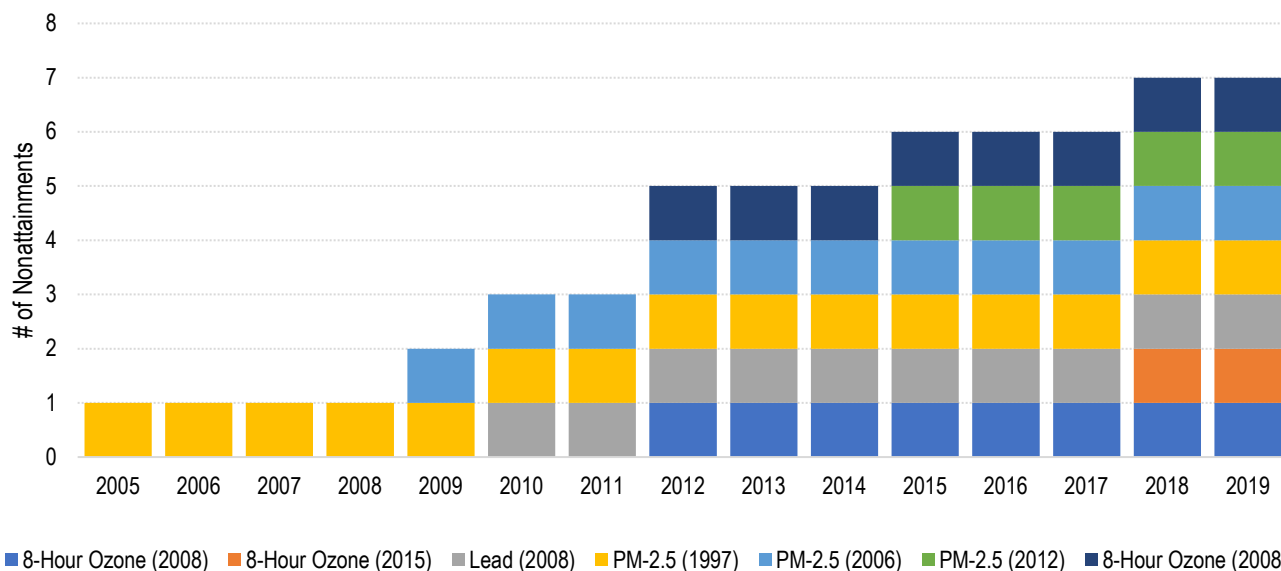


Source: South Coast Air Quality Management District

The ozone standards are most directly related to vehicular emissions, as ozone results from the photochemical reaction of a chemical combination of oxides of nitrogen and volatile organic compounds. Since 2000, the district has reduced the number of nonattainment days of the 1979 ozone standard almost threefold. The reduction of nonattainment days for the 1997 and 2008 standards has been less marked, only 24.4 percent and 19.8 percent, respectively.

Among the objectives enumerated by the SCAQMD 2016 AQMP is the reduction or elimination of unspecified or nebulous future technologies as emission reductions strategies. Rather, the AQMP stresses the need to rely on available or soon-to-be-available technologies to meet the AQMP’s goals.

Exhibit 6-6: Nonattainment of Emissions Standards, SCAQMD

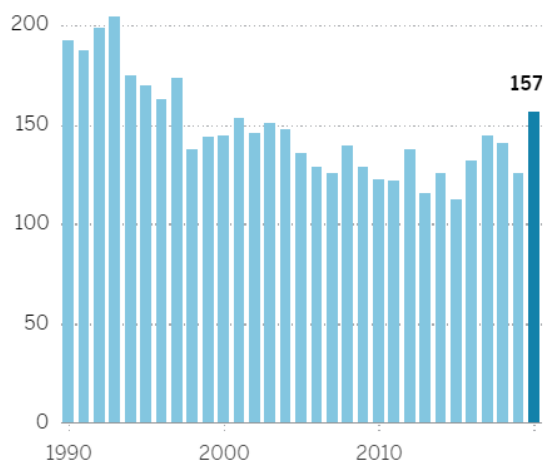


Source: Environmental Protection Agency

The AQMP also prioritizes non-regulatory means by which emissions reductions could be achieved.¹³ In late 2015, the EPA approved a new standard for ozone, lowering the volume threshold for a violation of 70 ppb (or 0.070 ppm).¹⁴

**Exhibit 6-7
Bad Air Days in Southern California**

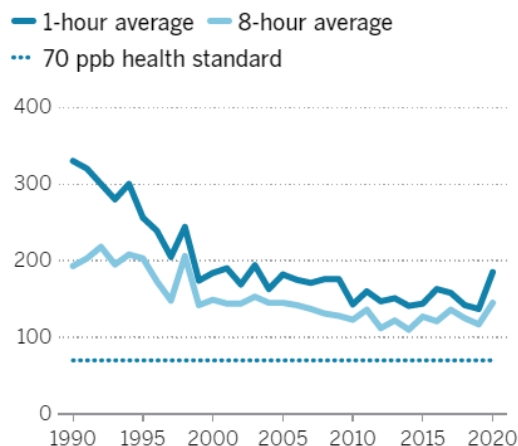
Number of days in the South Coast Air Basin with ozone pollution above 70 parts per billion



South Coast Air Quality Management District, California Air Resources Board
Source: Los Angeles Times; 157 Bad Air Days in the South Coast AQMD in 2020.

**Exhibit 6-8
Smog Levels in Southern California**

The highest ozone readings in the South Coast Air Basin, in parts per billion, compared to the federal health standard



South Coast Air Quality Management District, California Air Resources Board
Source: Los Angeles Times

¹³ "Executive Summary." 2016 Air Quality Management Plan. South Coast Air Quality Management District.

¹⁴ "Air Quality Management Plan." South Coast Air Quality Management District.

In 2020, SCAQMD recorded 157 days when the air quality exceeded NAAQS. Southern California experienced its worst ozone pollution readings and highest number of bad air days since the mid-1990s. Ground level ozone levels rose significantly following years of steady decline. In the near-to-medium-term, low-carbon and low-emission fuel solutions, such as World Energy's advanced renewable fuel products, will be critical to reversing this trend.

The focus of the 2016 AQMP is on emissions more immediately harmful to human health referred to as "criteria pollutants" and not on greenhouse gas (GHG) emissions such as CO₂. However advanced renewable fuel products have demonstrated the capability of contributing to significant reductions in GHG emissions as well, which will be discussed in the following sections.

Economic Impact of Nonattainment of Emissions Standards or Meeting Plan Goals

As part of the AQMP, SCAQMD commissioned a socioeconomic impact study authored by an internal team in collaboration with external advisors and an environmental justice working group. The socioeconomic analysis concluded that the 2016 AQMP would incur incremental costs of roughly \$16 billion between the AQMP's implementation and 2031, the year of the last NAAQS attainment deadline targeted by the AQMP. Most of these costs would be incurred by state and federal government incentives and grants.

However, the report estimates between \$66 and \$273 billion in possible cumulative health benefits to the region's residents. Including health benefits and assuming incentive funding from existing state revenues, this analysis concludes 1.04 percent annualized job growth (two basis points above baseline) with 14,000 additional annual job gains over the AQMP's period (2016 to 2031 despite a presumed new AQMP implemented in 2022).¹⁵ Put another way, failures to meet the goals of the AQMP means at least \$66 billion in benefits foregone.

Successful implementation of the SCAQMD Air Quality Management Plan, supported by low-carbon fuels, is expected to bring cumulative health benefits of at least \$66 billion.

The analysis also indicates an average of 95,892 fewer person-days of work lost due to lower PM_{2.5} exposure and an average of 105,451 fewer person-days of school forgone due to reduced short-term ozone exposure under a successful implementation of the AQMP.¹⁶ Again, these benefits can be inversely perceived as opportunity costs for an AQMP not being successfully implemented.

SCAG Regional Transportation Plan/Sustainable Communities Strategy

Two additional regional plans are operating concurrently with the 2016 AQMP targeting GHG's and other vehicular emissions as both climate change mitigation strategies and strategies to generally improve ambient air quality and public health. Adopted in September 2020, the Southern California Association of Governments' (SCAG) 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (Connect SoCal) identified initiatives at the intersection of land use,

¹⁵ "Final Socioeconomic Report." 2016 Air Quality Management Final Plan. South Coast Air Quality Management District. Pg. ES-4.

¹⁶ Ibid. Pg. 3-7.

transportation, and technology to close the gap and reach the region's greenhouse gas reduction goals.

Connect SoCal stipulates that by 2045 it would reduce daily passenger vehicle fuel use by 10.8 percent and GHGs by 19 percent by 2035. Moreover, the plan forecasts a reduction of 5.3 percent in reactive organic gases (ROGs); 5.7 percent reduction in carbon monoxide; and 4.1 percent reduction in 2.5-micrometer particulate matter (PM2.5).¹⁷ The plan notes to reach these goals:

*“Cleaner fuels and emergent vehicle technologies will help to significantly reduce many of the pollutants that contribute to smog and other airborne contaminants that impact public health in the SCAG region.”*¹⁸

San Pedro Bay Ports Clean Air Action Plan

The Ports of Los Angeles and Long Beach comprise the San Pedro Bay Port Complex, which handles more containers per ship call than any other port complex in the world. The San Pedro Bay Port Complex handles 73 percent of the market share for the West Coast and 30 percent nationally. The ports generate 999,000 jobs in the five-county Southern California region.

In 2006, the San Pedro Bay Ports jointly adopted the Clean Air Action Plan (CAAP). This landmark air quality plan established the most comprehensive, far-reaching strategy for reducing port-related air pollution and related health risks while allowing port development, job creation, and economic activity associated with that development to continue. The Clean Air Action Plan has subsequently been updated in 2010 and 2017, with the following goals:

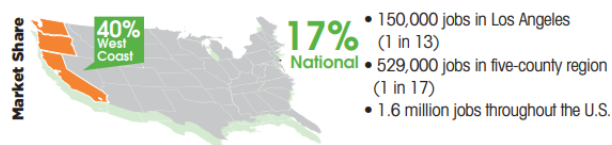
- Improve freight system efficiency by 25 percent by increasing the sector's GDP relative to carbon output by 2030;
- Deploy over 100,000 zero-emission or near-zero-emission freight vehicles and equipment by 2030;
- Establish targets for increased state competitiveness in the goods movement industry;
- Reduce GHGs from port-related sources to 40 percent below 1990 levels by 2030 and 80 percent by 2050; and
- Reduce port-related NO_x emissions by 59 percent, SO_x (sulfur dioxide) emissions by 93 percent, and DPM (diesel particulate matter) by 77 percent.¹⁹

Exhibit 6-9: Economic Impact of the San Pedro Bay Ports

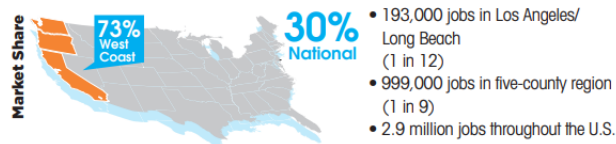
Economic Impacts

The Port of Los Angeles and neighboring Port of Long Beach comprise the San Pedro Bay port complex, which handles more containers per ship call than any other port complex in the world. Worldwide, the Port of Los Angeles ranks number 17, and the San Pedro Bay port complex ranks number 9.

Port of Los Angeles



San Pedro Bay Port Complex Port of Los Angeles + Port of Long Beach



¹⁷ “Measuring Our Progress for the Future.” The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments. Southern California Association of Governments. Pg. 137.

¹⁸ Ibid. Pg. 152.

¹⁹ “CAAP Goals.” Clean Air Action Plan 2017 Final. San Pedro Bay Ports. Pg. 23-25.

CAAP's first strategy is to accelerate deployment of clean vehicles, equipment technology, and fuel. Under this strategy, the Clean Trucks Program is the first element and includes near-zero and zero emissions strategies that include natural gas, near-zero diesel, and hydrogen fuel cells. As updated in the 2017 final draft of the CAAP, the Clean Trucks Program requires the following:

- New trucks in the ports' drayage truck registry (PDTR) must have a 2014 model engine or newer;
- By early 2020, all heavy-duty trucks will be charged a fee to enter the ports' terminals, with those that meet the near-zero standard or better exempted;
- Starting in 2023 or sooner, depending on state standards, new trucks must meet the near-zero-emissions standard or better; and
- By 2035, modify the truck rate so that only trucks that meet the zero-emissions standard are exempt.²⁰

A 2017 economic and workforce analysis of the CAAP update made in that same year concluded that the CAAP could result in 32,000 new construction jobs based on projections.²¹ This same study leaves open the potential for new jobs created from increased demand for new equipment, vehicles, and other resources necessary to meet the CAAP's goals. As such, World Energy's estimated job creation through

World Energy's estimated job creation through its capital expenditures and expanded ongoing operations would contribute to the 32,000 jobs predicted by the CAAP as port operators shift to cleaner fuels.

its capital expenditures and expanded ongoing operations would contribute to the job creation predicted by the CAAP as port operators shift to cleaner fuels.

Downside Fiscal Risks of Nonattainment of Regional Environmental Goals

Though distinct from the AQMP, the overlap among the SCAG Connect SoCal, Ports' CAAP, and the South Coast AQMP means that one plan's success or failure will be largely dependent on the success or failure of the others. The San Pedro Bay Ports and the CAAP are a key element in the Connect SoCal, and the CAAP and Connect SoCal are key elements of the AQMP's control strategy and implementation. As such, the CAAP and Connect SoCal will be essential to the success of the AQMP.

The continued economic success of the Southern California region depends on successfully attaining these environmental goals, not simply because of the obvious health and quality of life impacts and the effects of the attractiveness of the region, but due to the potential penalties that could result if the goals are not attained. The Clean Air Act governs state and regional emissions and air quality management plans. Section 110 of the Act authorizes the administrator of the EPA to impose sanctions listed in Section 179 either on the state or on the political subdivisions

The Southern California region risks losing \$1.64 billion annual federal transportation funding unless it makes significant progress towards meeting federal air quality standards.

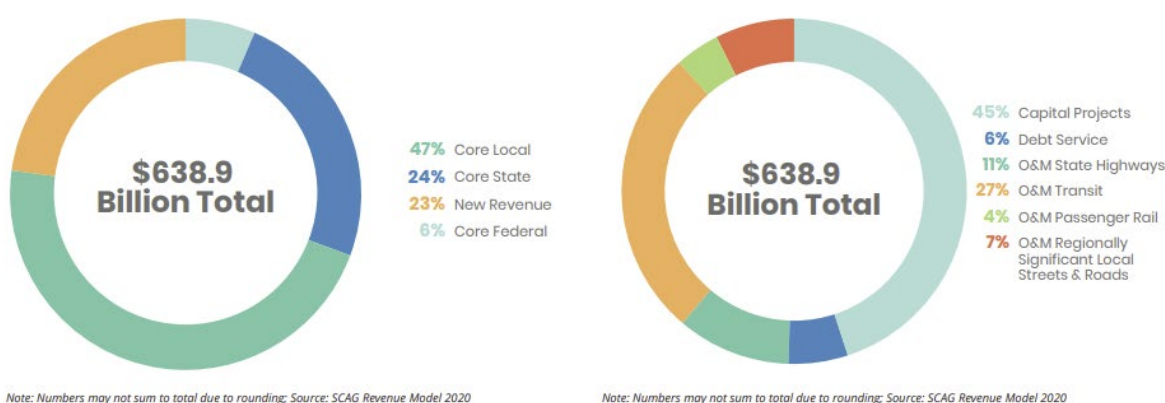
²⁰ "Clean Vehicles and Equipment Technology and Fuels." Clean Air Action Plan 2017 Final. San Pedro Bay Ports. Pg. 35.

²¹ "Construction Jobs." Economic and Workforce Considerations for the Clean Air Action Plan Update. San Pedro Bay Ports Clean Air Action Plan 2017. November 2017. Pp. 15-16.

responsible for a deficiency in meeting an implementation plan for national primary and secondary NAAQs.²² Under Section 179, the EPA administrator may prohibit the Secretary of Transportation’s approval of any projects or grant awards other than projects or grants for safety as determined by the Secretary.²³ Under this section, the Secretary retains some additional discretion in approving highway improvements and capital programs for public transit.

As the following exhibit demonstrates, most of core federal funds assumed by Connect SoCal come from the U.S. Department of Transportation. Federal funds total \$41.1 billion across the lifetime of Connect SoCal, or \$1.64 billion annually. A significant portion of these funds could be at risk for nonattainment of the SCAQMD AQMP, in particular.

Exhibit 6-10: Core Funding Sources, 2016-2040 SCAG Regional Transportation Plan/Sustainable Communities Strategy



Though it is unlikely that the entirety of these funds would be revoked should the region experience continual NAAQs nonattainment, any loss in these funds would constitute the difference between a wholly funded Connect SoCal and a deficient funding structure. Given the local, state, and national policy emphasis on climate, any funding reduction related to the attainment of air quality standards should be avoided.

California Governor Zero Emissions Vehicle Mandate

In addition to these regional environmental ambitions, California Governor Gavin Newsom signed an executive order in September 2020 mandating that 100 percent of all in-state light-duty vehicle sales be zero-emission by 2035, which would lead to a 35 percent reduction in GHGs and 80 percent reduction in oxides of nitrogen. The order requires all medium-and-heavy-duty vehicles to be 100 percent zero-emission by 2045 and requires CARB to develop attendant regulations to enforce the order. Gasoline-powered

World Energy’s Renewable Fuels Project at the Paramount facility will provide a greater volume of renewable fuels essential to meet the California Governor’s Zero Emissions Vehicle Mandate.

²² “State implementation plans for the national primary and secondary ambient air quality standards.” Clean Air Act Title I, Part A, Section 110, U.S. Code 7410.

²³ “Sanctions and consequences for failure to attain.” Clean Air Act Title I, Part D, Section 179, U.S. Code 7509.

cars would still be available on the used car market.²⁴ This additional mandate will necessarily require the adoption of all zero-emissions technologies. The executive order includes specific mention of renewable fuels in its opening clauses. Item 8 of the order states the California EPA and California Natural Resources Agency “shall expedite regulatory processes to repurpose and transition upstream and downstream oil production facilities, while supporting community participation, labor standards, and protection of public health, safety, and the environment.”²⁵ In tandem with the Governor’s order, World Energy already manufactures renewable fuels while also undertaking the transition of legacy oil production facilities through its complete conversion of the Paramount site. World Energy’s hydrogen production capacity would also assist with meeting state ZEV goals for those vehicles using hydrogen as a fuel.

Both the Los Angeles and the greater Southern California regions have committed to an array of environmental goals emphasizing GHG reductions, emissions mitigations, efficiency gains, and environmental justice (EJ), especially for those in vulnerable communities. Alternative fuels are only alluded to and do not feature prominently among implementable technologies, other than hydrogen fuel cells. However, each plan is purposefully vague, allowing ample room for the adoption of emergent technologies. The case for renewable fuels taking an increasingly prominent role in current and future regional air quality and transportation initiatives is provided in the Appendix starting on page 66.

Conclusions Related to Environmental Plans and Policies

World Energy is already providing clean fuel solutions to advance Southern California’s environmental and air quality standards through its relationship with Los Angeles World Airports and customer base in the Southeast region of Los Angeles County. As has been demonstrated, advanced renewable fuel products are increasingly being adopted as long-term solutions to regional emissions hurdles. World Energy is a regional and national provider of alternative fuel solutions and has established partnerships with state and local regulators and public entities seeking strategies to meet the demands of EJ. In World Energy’s case, it is also a stakeholder in those Southeast Los Angeles County communities identified by SCAQMD as needing particular focus in the pursuit of more sustainable fuel consumption and cleaner air. As more companies like World Energy join the low-carbon fuels market, these important partnerships will increase with government and public entities placing the needed emphasis on addressing EJ concerns and issues.

The Southern California region has undertaken several major initiatives in the pursuit of reducing transportation-related emissions, meeting the challenges of climate change, and continuing toward the goal of improved public health and EJ. The South Coast AQMD is currently executing an AQMP in large part due to its chronic failure to meet national air quality standards. Continued failure could result in federal sanctions that could deprive other local authorities, such as SCAG, needed monies to pursue other long-term strategic planning related to transportation, community development, climate change, and the environment. The San Pedro Bay Ports are currently executing their Clean Air Action Plan both in response to local mandates to curb emissions but also in keeping with broader regional aims encompassed within SCAG’s strategic plans to green regional goods movement and transportation.

²⁴ “Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California’s Fight Against Climate Change.” Office of Governor Gavin Newsom. 23 September 2020.

²⁵ California Executive Order N-79-20.

Exhibit 6-11: World Energy provides low carbon fuels critical for all four of California's major environmental plans

As this section describes, the state and regional emphasis on electric vehicles, though undoubtedly essential to the success of these various plans, should not be the limit of policymakers' ambitions in terms of embracing alternative fuels and energy sources. Indeed, BEVs present their own challenges while the California electricity continues to grapple with reliance on natural gas as an essential ingredient in the state's energy mix. Moreover, the SCAQMD AQMP, the SCAG Connect SoCal, and the San Pedro Bay Ports' CAAP all leave room for new and emergent technologies to play an essential role in the region's energy transition. The evidence presented here demonstrates that advanced renewable fuels, both from an emissions perspective and in terms of existing and potential supply, are one such technology. As a provider of those solutions, World Energy is a critical collaborator for all private and public organizations seeking alternatives to legacy fuels and excess reliance on an electricity grid dependent on natural gas. Going forward, further research, education, and strategic partnerships between public agencies, interest groups, and private producers will be critical to regional adoption of renewable diesel and other non-battery energy sources, such as hydrogen, as part of the region's environmental and energy strategies.

As a provider of low-carbon solutions, World Energy is a critical collaborator for all private and public organizations seeking alternatives to legacy fuels and excess reliance on an electricity grid dependent on natural gas.

Section 7: Conclusion

The analysis contained in this document demonstrates World Energy's estimated role in the creation of billions of dollars in total output, value added, and labor income across thousands of jobs. Indeed, the ongoing business operations of World Energy between 2019 and 2024 are estimated to be responsible for \$19.2 billion in output, \$6.4 billion in value added, \$3.4 billion in labor income, and \$1.3 billion in local, state, and federal taxes across the U.S. These activities are also predicted to add the equivalent of 5,360 jobs in California, and nearly 13,000 jobs in the rest of the US.

Between 2020 and 2023, the Renewable Fuels Project and associated spending in Los Angeles County, California, and the rest of the U.S. is estimated to have commensurately significant impacts. Throughout 2020 to 2023, the LAEDC estimates that these capital investments will add \$4.2 billion in output, \$2.2 billion in value-added, over \$1.4 billion in labor income, and \$453 million in tax revenues across all geographies covered in this study. Additionally, the annual average equivalent of 5,110 jobs is estimated to be created due to these capital expenditures.

World Energy's investments in Southeast Los Angeles County also come at a critical time for Southern California, described in the previous section. Between the present and 2030, the region seeks to accomplish the goals outlined in the San Pedro Bay Ports CAAP, the SCAQMD AQMP, and the SCAG Connect SoCal. As is demonstrated, advanced renewable fuels have significant potential as mitigation solutions for NO_x, particulate matter, and CO₂. Moreover, trend data demonstrate increasing credits for more environmentally friendly feedstocks such as tallow and used cooking oil, both of which are will be key feedstocks at World Energy's Paramount facility upon completion of the Renewable Fuels Project.

World Energy helps Southern California:

- Retain \$1.64 billion annually in federal transportation funding;
- Attain \$66 billion in cumulative health benefits by meeting regional air quality mandates;
- Secure the region's position as a leader in international trade by enabling the San Pedro Bay Ports to fully implement the Clean Air Action Plan, delivering 32,000 construction jobs and hitherto unquantified gains in health benefits; and
- Ensure Southern California retains a leadership role in the production of biofuels and associated clean energy jobs.



World Energy's ongoing operations and Renewable Fuels Project in Paramount are expected to create thousands of jobs, generate billions in output, income, and tax revenue, and help the region meet public health and climate goals.

As World Energy builds toward hydrogen fuel production and distribution in Southeast Los Angeles County, it stands to remedy a significant capacity gap identified by CARB. Though state and local policy appear to emphasize battery-electric and hybrid vehicles, this reliance on battery and electric technology may conflict with an increasingly strained state electrical grid, at least in the near-and medium-term. This challenge is currently being confronted by California’s approximately 200 public transportation agencies that are seeking options to meet the target of 2040 to transition their bus fleets to 100 percent zero-emission.²⁶ To continue meeting air quality challenges and the journey to carbon net neutrality in the state, additional solutions, including renewable biofuels and hydrogen, must be included to make up for the current structural and technological deficiencies being experienced by the battery-powered vehicle market. World Energy’s low carbon liquid fuels can dramatically reduce the carbon emissions of existing vehicles in California (below levels of electric vehicles) today and require little or no investments or additional costs for legacy fossil fuel users.

The LAEDC IAE has previously attested to the green and high-paying workforce implications of the clean energy economy. This study concerning World Energy provides evidentiary support to this assertion. Moreover, World Energy is a demonstration of how the legacy of oil and gas production in Los Angeles County, particularly in Southeast Los Angeles County, provides the infrastructure to realizing a healthier, more sustainable, and carbon neutral future in the region, the state, and the country.

World Energy’s Renewable Fuels Project in Paramount not only helps Los Angeles County build back better from the COVID-19 pandemic but also keeps manufacturing jobs local.

²⁶ “California transitioning to all-electric public bus fleet by 2040.” California Air Resources Board. 14 December 2018.

Appendix

The following sections provide additional information concerning the several climate and emissions plans and programs described in Section 6.

SCAQMD Air Quality Management Plan

SCAQMD is responsible for developing and adopting plans and regulations for the South Coast Air Basin, which includes the whole of Orange County, Los Angeles County southwest of Antelope Valley, urban San Bernardino County, and Riverside County west of the Joshua Tree National Monument.²⁷ Per the Clean Air Act, regions not attaining national ambient air quality standards (NAAQS) must develop and implement an emission reduction plan like the South Coast's Air Quality Management Plan (AQMP) to bring the jurisdiction area into federal compliance within an allotted period. The Environmental Protection Agency sets NAAQS for six primary pollutants and the average time for which the pollution must exceed a certain level for the NAAQS to be considered violated. The NAAQS as determined by the EPA are the following²⁸:

Exhibit A-1:

National Ambient Air Quality Management Standards (NAAQS)

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	primary	8 hours 1 hour	9 ppm 35 ppm	Not to be exceeded more than once per year
Lead (Pb)	primary and secondary	Rolling 3-month average	0.15 µg/m ³ (1)	Not to be exceeded
Nitrogen Dioxide (NO ₂)	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O ₃)	primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	primary	1 year	12.0 µg/m ³	annual mean, averaged over 3 years
	secondary	1 year	15.0 µg/m ³	annual mean, averaged over 3 years
	primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
PM ₁₀	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
	primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
Sulfur Dioxide (SO ₂)	primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Since final area designations for standard nonattainment did not occur until April 2018, the 2015 ozone standard did not appear in the 2016 AQMP. However, this standard (70 ppb or 0.070 ppm) is

²⁷ South Coast Air Quality Management District.

²⁸ "NAAQS Table." Environmental Protection Agency.

set to appear in the intended 2022 AQMP. Since the approval of the AQMP in 2017, two standards, the 1979 1-hour ozone and 1997 8-hour ozone standards, have been revoked by the EPA. In the case of the 1979 standard, the classification of nonattainment was revoked in 2018 when SCAQMD demonstrated attainment of this standard by 2022 through an updated attainment demonstration.²⁹ The 1997 standard was revoked by the EPA in 2015 in the implementation of the final rule for the 2008 standard.

The EPA has identified many strategies for state and local regulators in pursuit of emissions reductions. Alternative fuels are among those identified mitigation strategies. The EPA's notes on alternative fuels as mitigation strategies are given in the following table.

Exhibit A-2
EPA Emissions Control Strategies related to Renewable Fuels

Emission Reduction Measure Name	Control Efficiency (%)	Cost Effectiveness (2006\$/ton reduced)	Other pollutants controlled	Description/Notes/Caveats
Alternative Fuel Programs	NOx: 0%-60% VOC: 0%-13%	No cost-effectiveness available	PM, CO, SO ₂ , CO ₂	These programs encompass a number of different programs, including alternative fuel refuse trucks programs, alternative fuel vehicle conversion, alternative fuel or hybrid school/transit bus programs, public sector clean fuel fleets, private sector clean fuel fleets, and alternative fuels tax credit programs. The control efficiencies listed are ranges for biodiesel, CNG, LPG, and E85. For heavy duty vehicles, LPG may actually increase VOC emissions by up to 78% compared to diesel.
Alternative Fuel Programs	PM: 11%-99% SO ₂ : 19%-71%	No cost-effectiveness available	NO _x , VOC, CO, SO ₂ , CO ₂	These programs encompass a number of different programs, including alternative fuel refuse trucks programs, alternative fuel vehicle conversion, alternative fuel or hybrid school/transit bus programs, public sector clean fuel fleets, private sector clean fuel fleets, and alternative fuels tax credit programs. The control efficiencies listed are ranges for biodiesel, CNG, LPG, and E85. For heavy duty vehicles, LPG may actually increase VOC emissions by up to 78% compared to diesel.
Alternative Fuel Programs	PM: 34%-80% SO ₂ : 19%-77%	No cost-effectiveness available	NO _x , VOC, CO, SO ₂ , CO ₂	These programs encompass a number of different programs, including alternative fuel vehicle conversion, public sector clean fuel fleets, private sector clean fuel fleets, and alternative fuels tax credit programs. The control efficiencies listed are ranges for CNG and E85.

Source: "Menu of Control Measures for NAAQS Implementation." U.S. Environmental Protection Agency. < <https://www.epa.gov/air-quality-implementation-plans/menu-control-measures-naaqs-implementation>>.

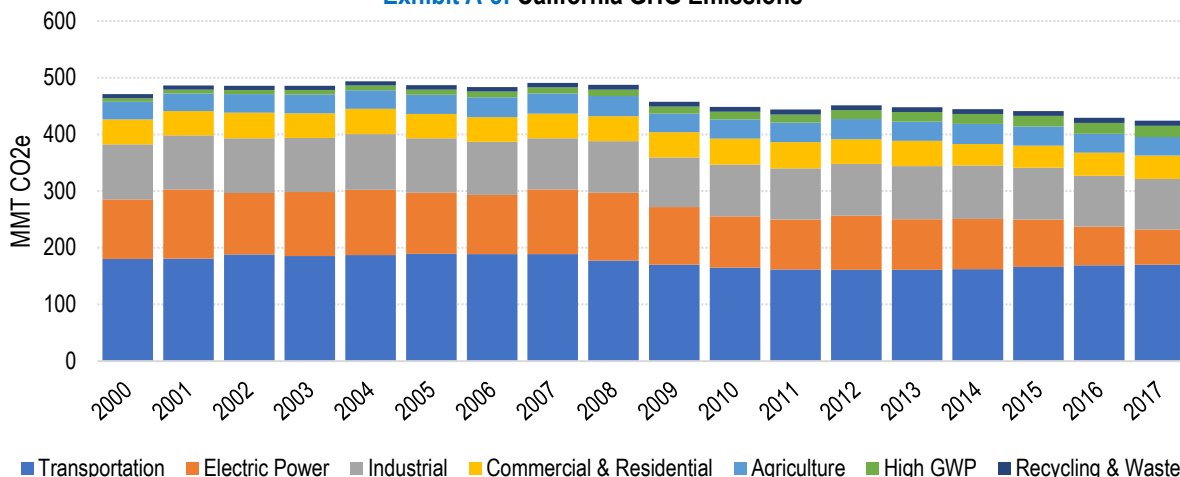
The Case for Renewable Diesel, Sustainable Aviation Fuel and Naphtha (life cycle emissions, carbon intensity)

Despite the efforts and intentions of state and local governments in California, the most persistent emitting sector of greenhouse gases is transportation. According to CARB, the state's transportation sector produced 169.9 million tons of carbon dioxide (MMT CO₂e) in 2017, the latest year for which data is available. This is a relative high point since 2009 when transportation carbon emissions were at 170.2 MMT CO₂e, indicating that carbon emissions have resurged since the end of the Great

²⁹ "Updated Attainment Demonstration of the 1979 1-Hour Ozone NAAQS." Final 2016 AQMP-CARB/EPA/SIP Submittal. South Coast Air Quality Management District.

Recession. Carbon emissions from transportation accounted for over 40 percent of emissions in 2017, the highest of any sector and more than the next two largest sectors, electricity and industry, combined. Among the subsets of transportation, passenger vehicles emit the majority of GHGs, accounting for almost 70 percent in that sector. Heavy-duty vehicles are a distant second, accounting for 21 percent of total emissions. Among all four subsectors of transportation, only aviation, rail and ships have experienced a significant reduction in emissions since 2000 with an almost 11 percent decline in GHGs since the beginning of the millennium. By contrast, passenger vehicle emissions had

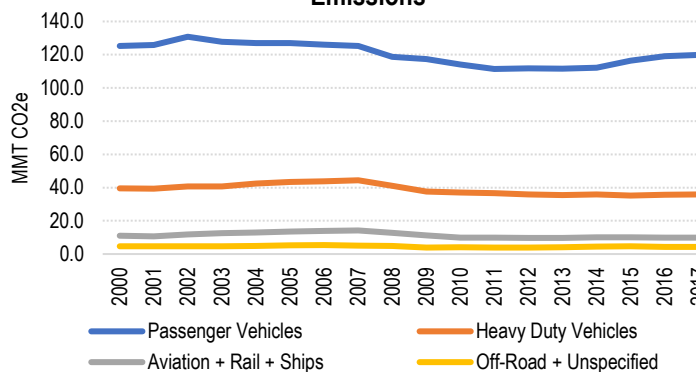
Exhibit A-3: California GHG Emissions



Source: California Air Resources Board

only been reduced by 4.2 percent as of 2017. Though this likely attests to consistent efforts in the goods movement and transportation industry to reduce emissions, this indicates that additional efforts will be necessary in order to address transportation related GHG emissions.

Exhibit A-4: California Transportation GHG Emissions



Source: California Air Resources Board

In the case of the CAAP, the focuses for emissions reductions are ozone and PM2.5. As is noted previously, ozone is the result of a photochemical reaction from a chemical combination of oxides of nitrogen (NOx) and volatile organic compounds. As such, NOx measurement and reduction are the focus of state and regional air quality regulators. The following exhibit demonstrates that NOx emissions, measured in tons emitted per day, have consistently fallen in the SCAQMD since 2010. Over the last decade, NOx emissions have fallen by 36 percent, with the largest reductions in mobile

sources (38.9 percent) and areawide sources (34 percent).³⁰ Among mobile sources, the top emitters of NOx in 2020 were light, medium, and heavy vehicles, both passenger vehicles and trucks.

Particulate matter **emissions** have been resistant to reduction over the same period. Between 2010 and 2020, PM2.5 emissions in SCAQMD fell only 1.3 percent. Indeed, stationary, areawide, and natural sources (including wildfires) of PM2.5 emissions all rose. Only mobile source-related PM2.5 emissions declined, with a reduction of 23.1 percent over the last decade. Though mobile source PM2.5 emissions have declined by almost a quarter, they still account for 18.7 percent of PM2.5 emissions. Among mobile sources, light and medium duty vehicles account for a combined 59.6 percent.

Among the many solutions identified by the EPA, alternative fuels have been identified as a control measure for oxides of nitrogen, volatile particulate matter, carbon monoxide, carbon dioxide, and sulfur dioxide for mobile sources of these emissions. Mobile sources include both ground and airborne vehicles. Alternative fuels are defined by the EPA as including hydrogen, natural gas, propane, ethanol, butanol, vegetable oils, waste-derived oils (as from beef tallow, for example), and electricity.³¹ The EPA’s assessment of alternative fuels as emissions mitigation strategies are given in the appendix.

Exhibit A-5: California GHG Emissions by Category, 2017

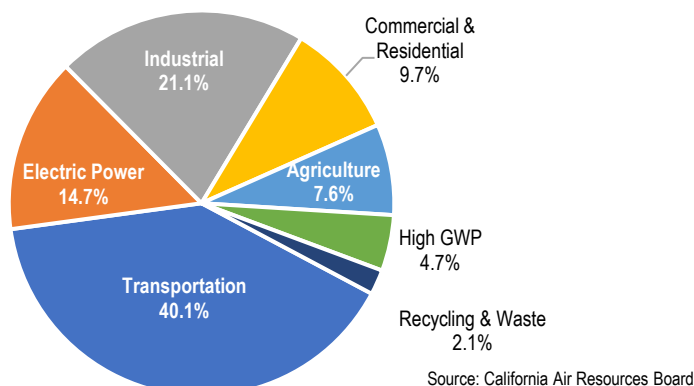


Exhibit A-6: SCAQMD regional NOx average annual emissions by source, 2010-2020

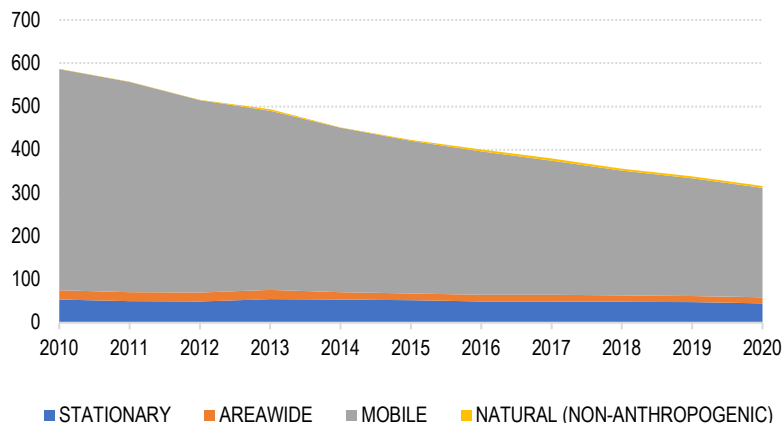
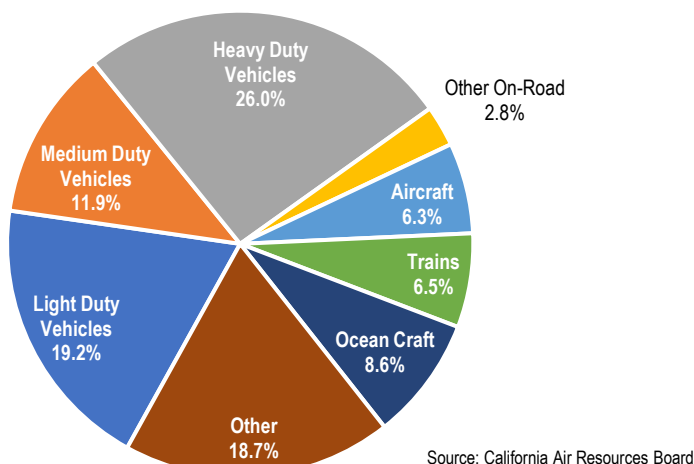


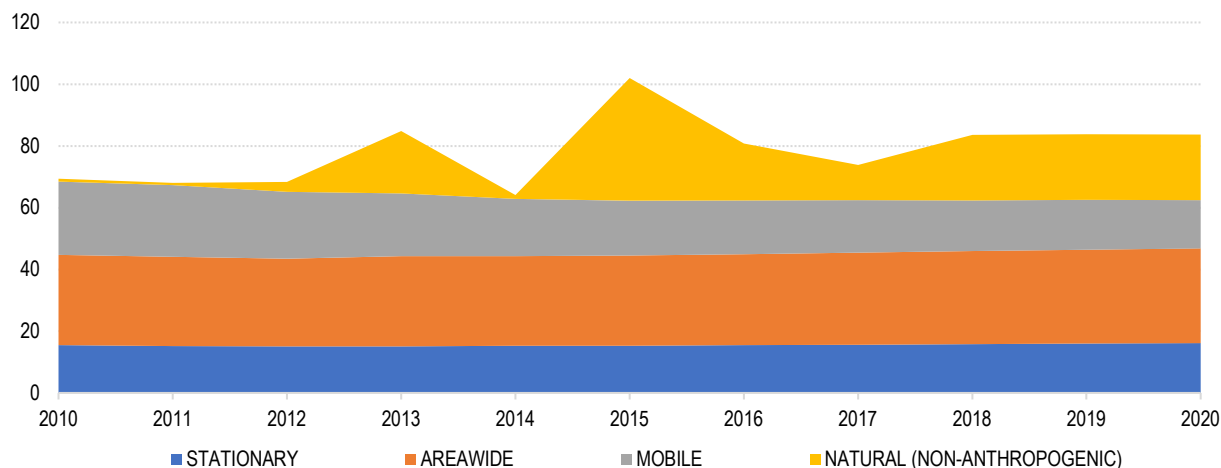
Exhibit A-7: SCAQMD 2020 Mobile NOx Emissions by Source



³⁰ Areawide sources include emissions from construction residues and solvents, consumer products and farming operations, among other sources.

³¹ "Alternative Fuels." Renewable Fuel Standard Program. The U.S. Environmental Protection Agency.

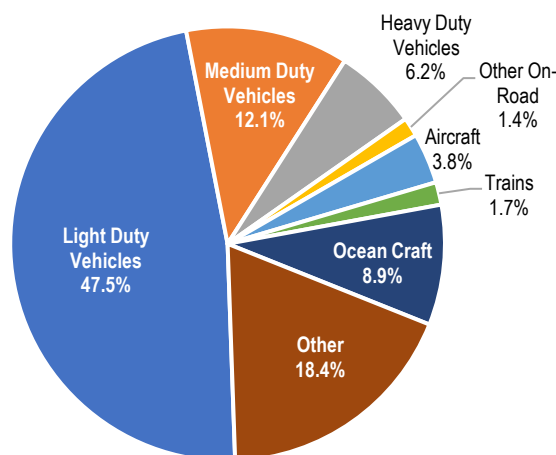
Exhibit A-8: SCAQMD regional PM2.5 emissions by source, 2010-2020



Source: California Air Resources Board

In addition to being identified as a source of emission reductions, biofuels and hydrogen, for ground vehicles and airborne transportation, have been identified as key reducers of carbon monoxide, sulfur dioxide, and particulate matter. The following exhibit demonstrates that, between a five percent and 50 percent SAF blend, a potential reduction of carbon monoxide of one to 11 percent; an oxide of sulfur reduction of between four and 37 percent; and a particulate matter reduction of between nine and 65 percent.³²

Exhibit A-9: SCAQMD 2020 Mobile PM2.5 Emissions by Source



Source: California Air Resources Board

In Los Angeles specifically, Los Angeles International Airport provider LAX Fuel has contracted World Energy to provide 10 million gallons in SAF over two years. Worldwide, use of SAF by United Airlines in particular has avoided the emission of 15,800 metric tons of CO₂. Van Nuys Airport, which is also administered by Los Angeles World Airports (LAWA), used 18,975 gallons of SAF in 2019 and has plans to purchase more in the future.³³ In 2018, World Energy produced most the world supply of SAF with a delivery of four million gallons to its customers, all of which was refined in its Paramount facility.³⁴

Advanced renewable fuels have also demonstrated lower lifecycle carbon emissions, or carbon intensity, compared to other energy sources, including electric vehicles. It is worth keeping in mind that, despite the obvious carbon reductions due to avoidance of fossil fuels, electric vehicles

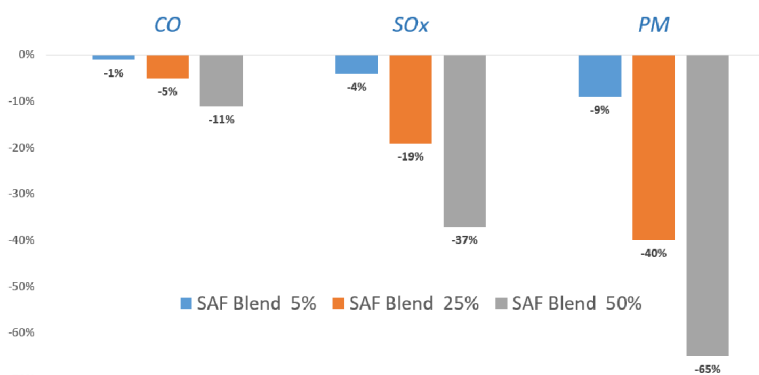
³² "Alternative Jet Fuels Emissions: Quantification Methods Creation and Validation Report." Airport Cooperative Research Program. Booz Allen Hamilton. August 2019.

³³ "Air Emissions Management." 2019 Sustainability Report. Los Angeles World Airports. Pgs. 27-28.

³⁴ Silk, Robert. "Sustainable Fuel Taking Off." *Travel Weekly*. <<https://www.travelweekly.com/Travel-News/Airline-News/Sustainable-fuel-taking-off>>.

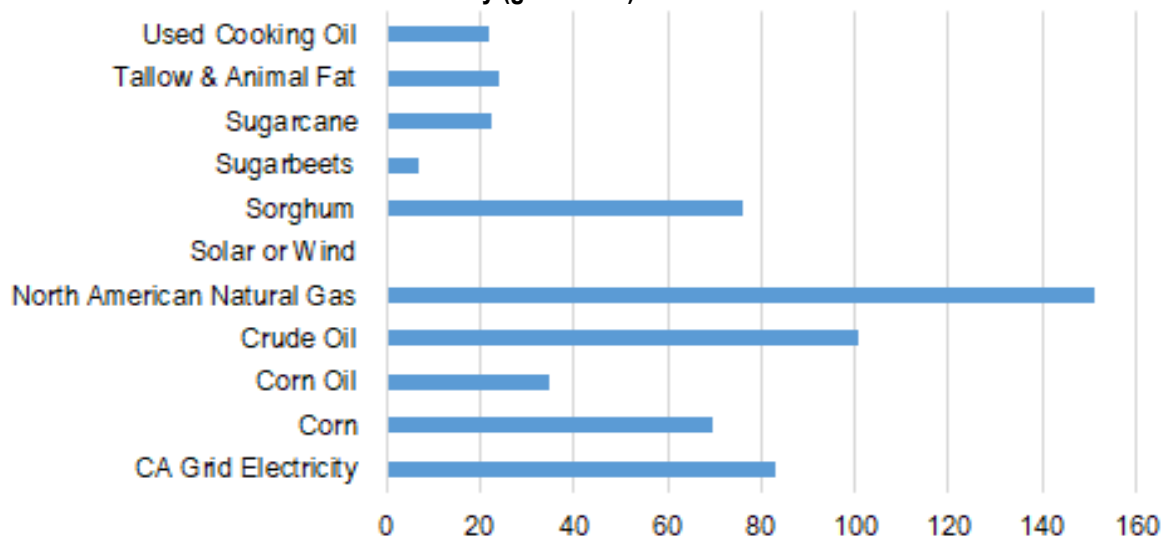
contribute to carbon emissions through use of the electrical grid. As the table below demonstrates, several renewable biofuel sources, such as used cooking oil, sugarcane, and corn oil have carbon intensities (measured in grams of CO₂ emitted per megajoule of energy created) below 40. By contrast, the California electric grid’s carbon intensity is close to 83, energy efficiencies (3.4) reduce net BEV carbon intensity to 25. Biofuels derived from sugar beets have a carbon intensity of 7.2, and World Energy’s renewable biofuels derived from beef tallow have been measured to date to have carbon intensity of 19.51 with a likely reduction in early 2021 to an intensity of 14 to 15.³⁵ In either case, World Energy’s fuel solutions are roughly 60 percent the carbon intensity of battery electric vehicles. As a comparison, fuel cell electric vehicles (FCEVs) are estimated to have a ten-year life cycle greenhouse gas emission footprint of 27.5 metric tons of CO₂ equivalent.³⁶ World Energy’s fuel production relies entirely on corn oil, rendered UCO, and rendered tallow, all of which are identified in the following exhibit as being among the four lowest feedstocks for carbon intensity.

Potential Emission Reductions from SAF Use at Major Bay Area Airports (by blend %)



Source: ACRP Web-Only Document 41 (02-80 study), based on Figure 12, National Academies Press, August 2019, http://onlinepubs.trb.org/onlinepubs/acrp/acrp_wod_41.pdf

Exhibit A-11: Certified Max Carbon Intensity (gCO₂e/MJ)



Source: California Air Resources Board

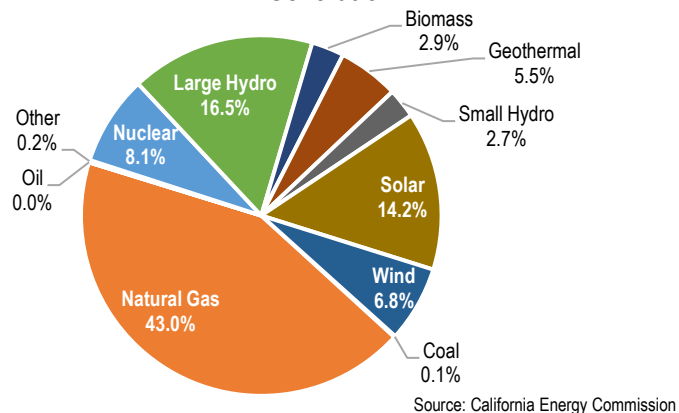
Battery-powered electric vehicles will continue to be hampered by the makeup of the California electrical grid in terms of attributable emissions so long as fossil fuels provide a substantial portion

³⁵ World Energy.

³⁶“Comparative life-cycle greenhouse gas emissions over ten-year lifetime of an average mid-size car by powertrain, 2018.” *Global EV Outlook 2020*. Technology report. International Energy Agency. June 2020. <<https://www.iea.org/reports/global-ev-outlook-2020>>.

of the grid’s generation capacity. In 2019, natural gas alone provided 43 percent of California’s in-state electric power and over 11.5 percent of imported power.³⁷ Additionally, battery electric vehicles may remain a net contributor of emissions while the preponderance of charging takes place in the early evening, the time of day when natural gas energy generation is the highest.³⁸ Total reliance on renewable energy will continue to remain elusive while storage technology lags behind overall adoption of wind and solar power sources.

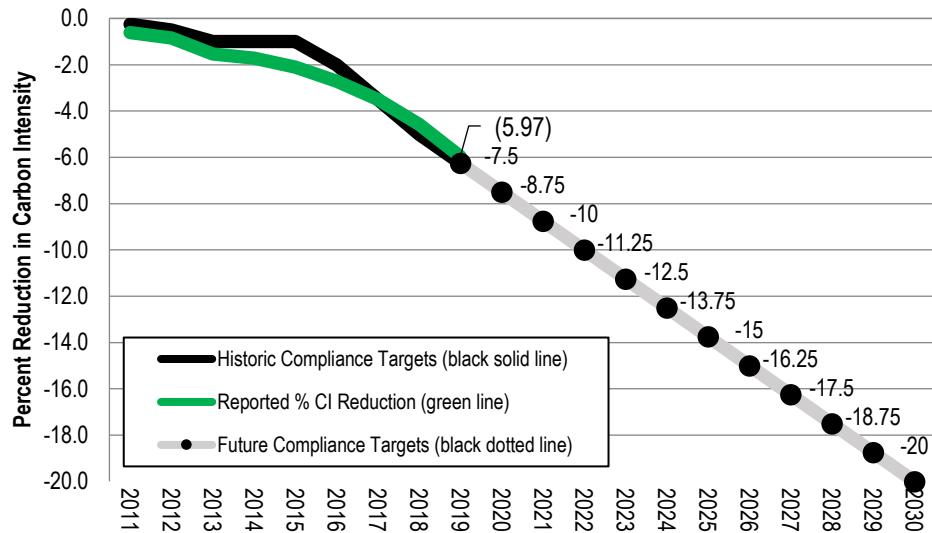
Exhibit A-12: 2019 Total CA Electric Grid Generation



Trends in Renewable Diesel production, consumption and vehicle procurement in California

In order to more proactively address specific state and regional plans regarding emissions and air quality in addition to general ambitions to limit climate change, CARB has stipulated incrementally higher reductions (20% by 2030) in carbon intensity over the next decade. In order to meet these increasingly stringent carbon

Exhibit A-13: Carbon intensities based on composite of gasoline and diesel fuels

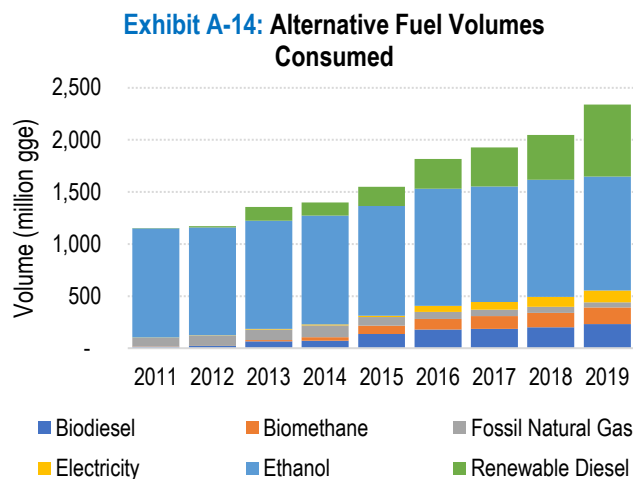


intensity requirements, their market-based low carbon fuel standard (LCFS) credit price has climbed to near \$200/MT of CO₂ equivalent, which is encouraging increasing numbers of credit generation.

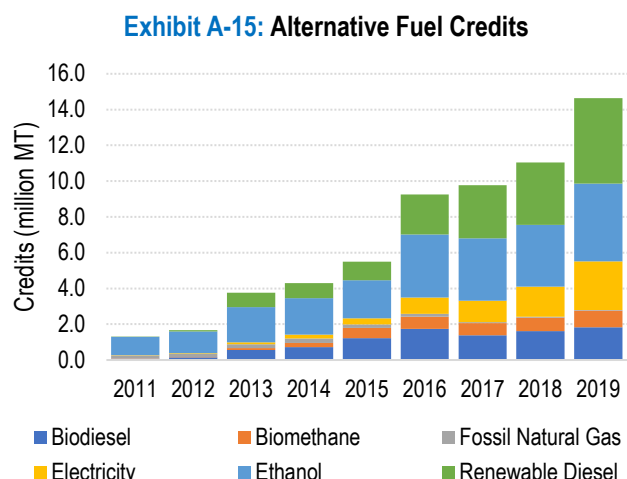
As can be seen in the following graphs, increasing volumes of both renewable diesel and ethanol have been consumed since 2011, with renewable diesel in particular experiencing a 340 percent increase in consumption. Similarly, non-ethanol derived alternative fuels have made up an increasing proportion of the LCFS credits granted annually, growing from 22 percent of credits granted in 2011 to 70 percent of credits in 2019.

³⁷ California Energy Commission.

³⁸ Blunt, Katherine. “California Blackouts a Warning for States Ramping Up Green Power.” The Wall Street Journal. 17 August 2020.



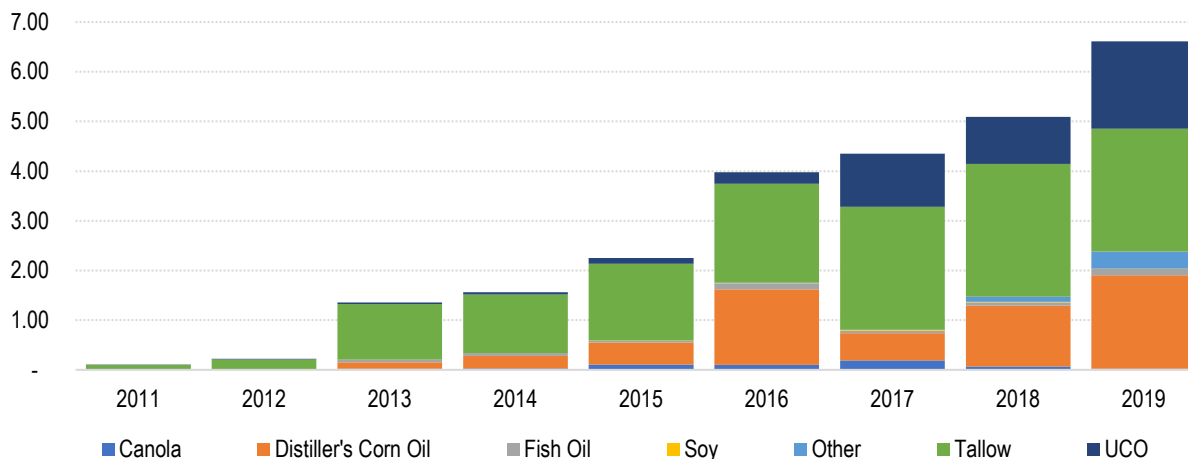
Source: California Air Resources Board



Source: California Air Resources Board

As was noted in the previous section, the feedstocks use to make biodiesels and renewable diesel have varying lifetime carbon intensities, with tallow and used cooking oil (UCO) having among the lowest lifecycle CI's. The exhibit below demonstrates that tallow, corn oil, and used cooking oil have increased their share of credits allocated among the six specific feedstocks tracked by CARB. Producers using these three feedstocks have received over 90 percent of LCFS credits since 2011; however, credits given to producers using UCO, distiller's cooking oil, and tallow, respectively, increased the most over the period. The exception is credits given for canola-based fuel production, which had the third-largest growth over the period. Of note is that three out of four (except canola) of these feedstocks are from wastes and residues and not crops.

Exhibit A-16: Annual Credits (MMT) for each feedstock of BD/RD



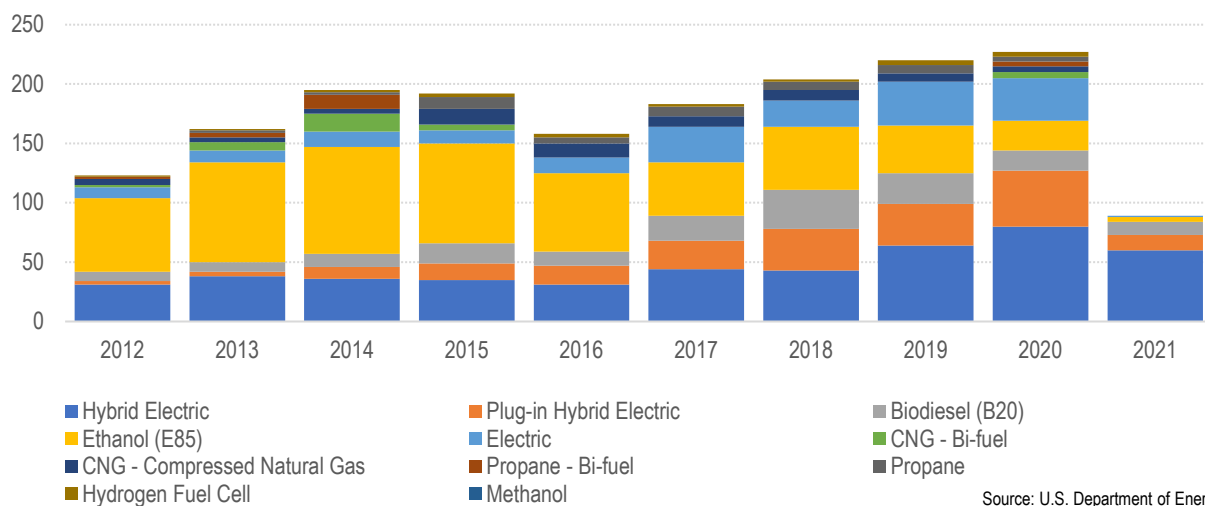
Source: California Air Resources Board

In addition to growing biofuel supply, domestic and foreign automakers have increased their offerings of alternative fuel light duty vehicles, including biofuel (B20) vehicles. Since 2012, biofuel

models have increased 113 percent. By contrast, both electric vehicle offerings and hydrogen fuel cell offerings having increased 300 percent.

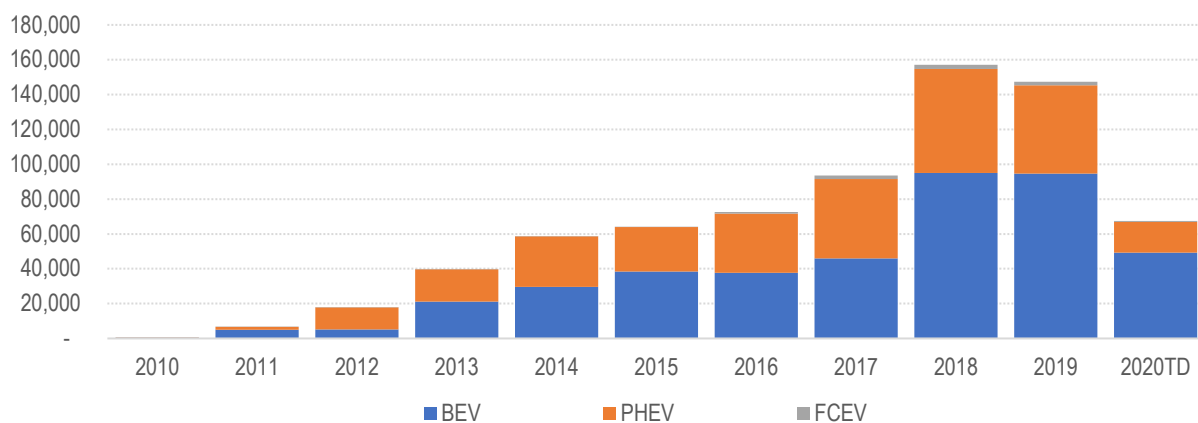
At full operational capacity, World Energy projects it will be capable of delivering 341.4 million gallons of renewable diesel annually, equivalent to 49.4 percent of renewable diesel consumed in California in 2019.

Exhibit A-17: Light Duty Vehicle Models by Fuel Type



Despite alternative fuels being more widely available and readymade for immediate adoption in traditional combustion engines, market demand has been limited. Moreover, some agencies, such as the California Clean Vehicle Rebate project, does not track nor offer incentives for alternative fuel vehicles beyond hybrid electric (PHEV), battery electric (BEVs), or hydrogen fuel cell vehicles (FCEVs). As such, renewable diesel vehicles (which are all diesel vehicles, since it is fungible with petroleum diesel) are not tracked to the same degree by state and federal agencies in terms of sales and adoptions. There is evidence, however, that California consumers remain amenable to adoption of non-battery electric vehicle options if provided sufficient infrastructure, incentives, and make and model options. Indeed, between 2010 and 2019 FCEV sales grew 159 percent. Though less than the

Exhibit A-18: ZEV Sales in California



195 percent growth in BEV sales and significantly less than the 304 percent growth in PCEV sales, it should be noted that OEMs only offered four 2019 models in FCEVs compared to 36 new BEV models and 80 PHEV models.

Though not yet a large-scale hydrogen fuel producer, World Energy will produce excess hydrogen to its renewable diesel process needs and will be well-positioned to be a contributor to an increasingly large FCEV market. As of April 2020, CARB estimates there almost 7,200 FCEV registrations and forecasts 27,000 FCEVs by 2023 and 48,900 by 2026 in California based on California Department of Motor Vehicle (DMV) registration data and auto manufacturer survey responses.³⁹ There are also FCEV Class 8 heavy duty trucks currently operational and serving as test vehicles, which may grow this technology further. On the other hand, CARB also estimated Los Angeles County in particular will experience a 0.35 million kilogram per year hydrogen fueling capacity deficit by 2026.⁴⁰ Additional producers, such as World Energy, with existing capacity to produce and deliver hydrogen fuel to market, will be essential to meeting fuel capacity needs.

Data concerning heavy duty vehicle fleets operated by the state of California, who will likely be first adopters of alternative fuel vehicles due to purchasing mandates, also indicates demand for alternative fuel vehicles should sufficient options become available. Among the state's acquisitions between 2015 and 2019, only electric and hydrogen fuel cells acquisitions increased, 11 and 163 percent, respectively. On the other hand, state operation of gasoline-, ethanol-, natural gas-, and methanol-powered vehicles all declined. Most of these vehicles appear to have been replaced by propane-powered vehicles, whereas the one biodiesel-powered vehicle and one renewable diesel-powered vehicle were not replaced.

There is an existing policy and supply-side environment in which the adoption of renewable diesel vehicles across all categories could experience significant growth in the coming years. Provided these fuel sources receive the same attention as BEVs, renewable diesel could become an essential element in regional and statewide efforts to curb emissions and combat climate change.

³⁹ "Location and Number of Fuel Cell Electric Vehicles." 2020 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development. California Air Resources Board. September 2020. Pgs. 15-16.

⁴⁰ Ibid. Pg. 52.

Exhibit A-19: California State Vehicle Fleet by Fuel Type

