Final Report

Economic Impact on Riverside County of the Proposed Palen PV Solar Project

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EPS #171075

The Economics of Land Use

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1. EXECUTIVE SUMMARY

Introduction

EDF Renewable Development, Inc. (Applicant) plans to construct and operate a 500 megawatt (MW) alternating current (ac) photovoltaic (PV) solar electric power generating facility (Project) to serve a portion of the electrical load requirements of California. The Project will be developed on vacant land administered by the Bureau of Land Management, north of the I-10 freeway in Riverside County. The Project is designed to have a useful life of up to 30 years, although the life span may be extended by upgrades and refurbishments. EDF Renewable Development, Inc. (EDF-RD) has retained Economic & Planning Systems, Inc. (EPS) to estimate the potential economic impacts of the Palen PV Solar Project in the County. The following section presents a summary of the estimated economic impacts of the Project.

Summary of Findings

Over the Project construction period and operation period, the proposed Project is expected to generate significant beneficial economic impacts in Riverside County as summarized in **Table 1**. These economic impacts reflect the total of direct, indirect, and induced economic impacts that will result from Project-related construction spending and operations. All dollar amounts are in constant 2017 dollars. The total economic impacts summarized in **Table 1** comprise direct and multiplier (indirect and induced) effects, which are separately discussed below.

Table 1 Total Employment, Employee Compensation, and Economic Output Impacts in Riverside County

Project Phase	Employment (Job Yrs.)	Employee Compensation	Economic Output (Rounded)
Construction (30 mos.)	2,519	$289,576,000	$503,601,000
Operations (30 yrs.)	454	$24,285,000	$36,095,000
Total Project	**2,973**	**$313,861,000**	**$539,696,000**

Sources: EDF Renewable Development, Inc.; JEDI PV Model; and Economic & Planning Systems, Inc.

Local Government Revenues

In addition to the economic output, jobs, and related employee earnings, the Project is expected to generate direct and multiplier sales tax revenues for the County and other local public agencies in Riverside County during the construction and operations periods, as shown in **Table 2**.

Table 2 Summary of Local Sales Tax Revenues

County Revenues	Low[1] One-Time[2]	Low[1] Ongoing Revenues (30 yrs.)	Low[1] Total (Rounded)	High[1] One-Time[2]	High[1] Ongoing Revenues (30 yrs.)	High[1] Total (Rounded)
Local Sales Taxes[3]	$411,805	$114,105	$526,000	$5,200,267	$114,105	$5,314,000

[1] High scenario assumes local sales tax capture on PV panels and inverters if project establishes a point-of-sale address for collecting sales tax on PV panels and inverters. Low scenario assumes only products actually purchased from establishments within the County generate sales taxes to the County. Further detail of tax derivations on Table A-3.
[2] Revenues generated prior to and during the construction period.
[3] Includes direct, indirect, and induced effects.

Sources: EDF Renewable Development, Inc.; JEDI PV Model; IMPLAN 2015; and Economic & Planning Systems, Inc.

As shown on **Table 2** the Project is estimated to yield between $526,000 and $5.3 million in local sales tax revenues to the County, with the difference being whether or not the County receives a share of sales and use taxes paid on all Project materials and equipment purchases through a "job site" arrangement. Of these revenues, between $144,500 and $4.9 million would be generated directly from the Project to Riverside County, while the multiplier effects would contribute about $382,000 to the total revenues (see **Table A-3**).

Direct Economic Impacts

- The direct economic impacts initially were calculated using the United States Department of Energy's "JEDI" (Jobs and Economic Development Impact) model. This model represents an industry standard for use nationwide, but is set up to accept economic factors and inputs for specific locations, such as Riverside County, as EPS has done for this analysis. However, upon review of the initial results of the JEDI modeling, EDF-RD believed that several JEDI results were over-stated compared to their previous experience on comparable projects. As a result, certain JEDI outputs have been reduced to yield a more conservative (i.e., attainable) estimate of job creation and economic activity.

- During the construction period, the Project is anticipated to spend approximately $202.6 million on construction labor and related services in the County and include about 1,400 full-time equivalent (FTE) job-years on site.

- On-site construction jobs will include electricians, ironworkers, laborers, etc., as well as project management staff. This analysis estimates that these workers will earn a total of approximately $169.2 million in wages and benefits, with an average compensation level of roughly $119,600 per year per FTE. Excluding benefits, the average compensation level per FTE is approximately $78,000 per year, or $37.50 an hour. This is further detailed in **Chapter 3**.

- Operation of the Project is expected to employ approximately 12 full-time employees each year or 360 job-years over 30 years earning a total of roughly $18.7 million (including benefits), with an average cost of approximately $52,000 per FTE, or $25 an hour. Excluding benefits, the average compensation level per FTE is approximately $33,900 per year, or $16.30 an hour. This is further detailed in **Chapter 3**.

Economic Impacts from Multiplier Effects

In addition to the Project's direct employment and related spending, the Project will purchase materials and equipment for installation, and will stimulate additional impacts through multiplier effects. Multiplier effects include indirect impacts that result from additional rounds of spending by businesses in the Project's supply chain and induced impacts from household spending by new project-related employees. Employees at the Project and at related businesses affected by the Project will spend their incomes on housing, transportation, medical services, and a variety of household goods and services such as food and clothing in the County. In total, the Project's multiplier effects in the County's economy are expected to result in a total of $318.4 million of economic output, supporting 1,200 job-years and $125.9 million of employee compensation (including benefits) over the construction and operations periods.

2. ECONOMIC IMPACT ANALYSIS METHODOLOGY

Regional economic impact analysis and Input-Output (I/O) models in particular provide a means to estimate total effects stemming from a particular industry or activity, and yield estimates of the number and types of jobs created, the amount of wages associated with those jobs, and the total economic output or "final sales" generated within various industries. I/O models rely on economic "multipliers" that mathematically represent the relationship between the initial change in one sector of the economy and the effect of that change on other interdependent industry sectors, corresponding changes in demand for inputs to *those* sectors, and so on. These effects are commonly described as "direct," "indirect" or "induced" and are generally defined as follows:

- The "direct" effect is the initial change in economic activity in a specific industry or sector. For example, economic activities (business revenues, jobs, employee earnings) at the new solar power plant would represent the direct impact on the Riverside County economy.
- The "indirect" effect results from industry-to-industry transactions required to support the direct activity. This effect is a measure of the change in the output of suppliers linked to the industry that is being evaluated. For example, construction of the new solar power plant will cause an increase in sales of construction materials, engineering services, and other goods from "business-to-business" suppliers in Riverside County and elsewhere. For this analysis, only indirect effects within Riverside County are estimated.
- The "induced" effect consists of impacts from employee spending in the regional economy. Specifically, the employees of directly and indirectly affected businesses generate this effect by purchasing goods and services in the regional economy (e.g., food, clothing, automobiles, health care, etc.). For this analysis, only induced effects within Riverside County are estimated.

The total economic impact is the sum of the direct, indirect, and induced effects, and measures the impact of an activity as it "ripples" through the economy.

Initial JEDI Modeling

This economic impact analysis utilized the US Department of Energy's Jobs and Economic Development Impact (JEDI) input-output (I/O) model.[1] Based on the model's default inputs and project-specific inputs, the JEDI model estimates the number of jobs and economic impacts to a local area (state, region, or county) that could reasonably be supported by a power generation project.

First developed by the U.S. Department of Energy, National Renewable Energy Laboratory's (NREL) Wind Powering America program to model wind energy jobs and impacts, the JEDI model has been expanded to biofuels, coal, natural gas and solar power plants. JEDI model defaults are based on interviews with industry experts and project developers. Economic multipliers

[1] JEDI PV Model "JEDI Project PV Model rel PV6.28.17" downloaded in June 2017.

contained within the model are derived from IMPLAN software and state data files.[2] Using model defaults, results are reported on a statewide scale for California. However, the JEDI model can be refined on a county, regional, or national basis by incorporating additional data (not included in the base model). Because Riverside County's economy may have different features than the national or state economy – such as suppliers of different types of Project inputs – and because the interest of this study is to understand the Project's local rather than statewide impacts, EPS has incorporated county-specific data for Riverside County from IMPLAN in order to generate results applicable to the County's economy. For this Palen PV Solar Project analysis, the model has produced quantitative estimates of the magnitude of regional economic activity resulting from the development and operation of a solar power plant in Riverside County, and has estimated those impacts within the County.

Adjustments to JEDI Results

Having reviewed the initial results of the JEDI modeling for the Palen PV Solar Project, EDF Renewable Development was concerned that JEDI may have overestimated the development cost of the Project, and thus the number of jobs and the level of economic activity associated with the Project may have been overstated as well. EDF-RD recommended that EPS reduce the JEDI-based results for the construction period to more closely align with their experience and expectations regarding total Project costs. In addition, EDF-RD recommended that total construction material costs, including the PV modules, inverters, mounting, and electrical materials, be reduced by 40 percent. JEDI's estimates of construction material costs are significantly higher when compared to the costs based on EDF-RD's experiences. Costs may also be higher partly due to lower PV panel costs in the 2017 market. As a result, the job creation and economic impact figures reported in this analysis are below those that come directly from JEDI. In this way, the reported results are more conservative and the levels of economic activity associated with the construction of the Project are more likely to be achieved.

Similarly, EDF-RD indicated that the number of on-site jobs created during the operations phase of the Project (the 30+ years of energy production) was potentially overestimated by JEDI compared to their own expectations. Again, EPS has reduced the JEDI-based findings for direct operations jobs to more closely align with EDF-RD's experience, resulting in a more conservative projection of operations jobs, and its multiplier effects, than produced by JEDI alone.

Caveats to Input-Output Modeling

The input-output methodology assumes that demand for goods and services by industries or households increases in direct relation to the increase in income, and that an increase in demand results in a proportional increase in *local* supply and employment. This implies fixed linear relationships between input (resource) use and output and between income and consumption.

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[2] IMPLAN is an Input-Output modeling system (software and data) developed by the Minnesota IMPLAN Group, and is widely used in the U.S. for estimating economic impacts across a wide array of industries and economic settings. IMPLAN data from 2015 was used, as it was the most up-to-date data available.

However, these relationships tend to vary with the income level and responses to final demand changes are not always likely to occur in direct linear proportions.

Second, I/O models assume that local suppliers have sufficient capacity to respond to changes in final demand by increasing their output and hiring additional workers without shifting any production resources (inputs) from other competing needs. This assumption may not hold in areas with tight labor or capital markets since suppliers may find it difficult to obtain these labor or material inputs or other resources necessary to expand production. However, with an unemployment rate of approximately six percent,[3] and a relatively large geographic area, Riverside County is not constrained by a tight labor market; as such the model's assumption is not expected to affect the accuracy of the results at this time.

[3] Unemployment rate is an estimate from July 2017 according to the California Employment Development Department.

3. ANALYSIS AND RESULTS

EPS has estimated the economic impacts during the construction phase and operations phase of the Project as summarized in **Table 3** and the Appendix. All monetary estimates are in constant 2017 dollars.

Direct Economic Impacts

Expenditures on labor represent the single largest Project expenditure in the local economy. As such, the JEDI model (with adjustments as discussed in **Chapter 2**) estimates direct impacts in the local economy during construction based on Project expenditures on labor only. During operations, direct impacts have been estimated based on continuing labor.

Table 3 Direct Economic Impacts of the Project

Project Phase	Employment (Job yrs.)[1]	Employee Compensation[2]	Economic Output
Project Construction[3]	1,415	$169,234,000	$202,580,225
Operations[4]	360	$18,720,000	$18,720,000
Total Direct Impacts	**1,775**	**$187,954,000**	**$221,300,225**

[1] Full-time equivalents. Direct employment also includes contracted workers during construction.
[2] Wage rates for construction workers based on EDF R-D's estimate of a $57.50 hourly wage (with benefits), derived from the IBEW Local 440 wage rates in Riverside County and EDF-RD's previous project experience. Wage rates for operations employees was also provided by EDF R-D at an hourly wage of $25 per worker (with benefits), assuming 12 full-time employees.
[3] Based on EDF R-D's estimations, the number of project construction employees was adjusted downward from JEDI output estimates of over 5,300 employees.
[4] EDF R-D plans for 12 full-time staff during operations, which is a modest estimation compared to JEDI's estimation of approximately 79 employees annually.

Sources: EDF Renewable Development, Inc.; IBEW Local 440; JEDI PV Model; and Economic & Planning Systems, Inc.

Direct Economic Impacts during the Construction Period

Table 3 shows a summary of the Project's estimated direct impacts on employment, employee compensation, and economic output in the County. Onsite construction activities will support employment for a total of about 1,400 FTEs over the construction period. These jobs will include electricians, ironmen, and other skilled labor in addition to general laborers. During this period, the difference between "Employee Compensation" (estimated at $169.2 million, including benefits) and "Economic Output" ($202.6 million) is attributable to overhead and profit for the

companies providing the construction labor. Below, **Table 4** breaks down the employee wages benefits, and total employee compensation.

Direct Economic Impacts during the Operating Period

Project operations will involve monitoring system status, performance, diagnostics, and planning, as well as preventive maintenance activities, and periodic corrective maintenance activities. The developer anticipates that 12 full-time employees will be required to manage the Project's ongoing operations, thereby creating approximately 360 total job-years over a 30-year operations period. The JEDI model indicates that "Employee Compensation" and "Economic Output" produce equivalent figures for the operations period. Again, these amounts are adjusted to reflect EDF-RD's previous project experience. **Table 4** reflects the employee compensation for direct operation jobs and shows the amount of compensation allocated to salary and benefits.

Table 4 Direct Construction and Operation Wages and Benefits

Project Phase	Employment (Job yrs.)	Wages	Benefits	Total Employee Compensation
Project Construction	1,415	$110,370,000	$58,864,000	$169,234,000
Operations[1]	360	$12,208,696	$6,511,304	$18,720,000
Total Direct Impacts	**1,775**	**$122,578,696**	**$65,375,304**	**$187,954,000**

[1] Based on EDF R-D's project construction benefits which reflects that benefits are approximately 53 percent of wages.

Economic Impacts from Multiplier Effects

Based on the Project's direct spending on labor as well as required materials and services, additional rounds of spending will occur in the County. Businesses in the supply chain (providing materials, equipment, and services) will respond to meet the Project's demand, and constitute the Project's "indirect" effects. Employees' spending on goods and services for their households —groceries, housing, healthcare, education, etc.—are also expected in the County, and constitute the Project's "induced" effects. In both cases, additional rounds of spending are captured in the impact estimates, such as the spending of the equipment rental company owner on maintenance services for her equipment and on groceries for her family. Together, the indirect and induced effects are known as multiplier effects.

Indirect Economic Impact

The Project's indirect impacts were estimated using the JEDI model based on local construction spending on goods and services as shown in **Table A-1**. As shown, spending on pre-development services and construction materials and services related to the Project's development is estimated to total approximately $914.1 million. Of this, about $274.4 million or 30 percent is estimated to be captured by businesses in the County, with the bulk of the Project spending attributable to photovoltaic panels and inverters not expected to be provided by local suppliers.

During the operations period, estimated local spending is based on cost estimates for goods and services that are anticipated to be sourced from vendors in the County. Exemplary purchases would include industrial supplies, business and professional services, labor and materials for periodic improvements (e.g., access road maintenance and weed abatement), and similar costs of doing business, and providers of these goods and services are expected to be available in the County and most convenient and cost-effective to serve the Project. As shown in detail in **Table A-1**, the JEDI model estimates an additional $7.2 million in indirect "supply chain" impacts during the 30-year operations phase.

Table A-2 shows a detailed summary of the indirect impacts on employment, employee compensation, and economic output generated as a result of the Project's spending at local businesses during construction and operations.[4] Indirect employee compensation for construction and operations totaled to $91.4 million, while indirect economic output summed to $207.1 million.

Induced Economic Impact

Induced impacts are based on estimated direct employee compensation of $169.2 million and $18.7 million during construction and operations, respectively, as shown in **Table A-2**. Additional induced impacts are also estimated from spending of indirect employees. Employees of the Project and employees at local businesses indirectly affected by the Project will spend their wages on a variety of goods and services. For example, if an employee at the Project spends her wages on food for her family, part of that spending goes to the retail worker who sells the food, part goes to the trucker who delivers the food, part goes to the farmer who grows the food, and part goes to various intermediaries (processors, wholesalers, transportation companies, etc.). Thus, in aggregate, the spending associated with direct and indirect employees' purchases creates demand for other businesses and helps to support other jobs in the County economy. Using the JEDI model ratios of induced jobs and spending, EPS estimated the additional economic impacts that would be generated through the Project's induced effects in the rest of the County.

Table A-2 shows these induced impacts on employment, employee compensation, and economic output during construction and operation of the Project. To summarize, the induced effects on total construction and operations had employee compensation total to about $34.5 million and economic output was approximately $111.3 million.

Local Government Revenue Impacts

In addition to the broader economic impacts described in the preceding sections, the Project will also benefit the County through local sales tax revenues. EPS estimates that the Project will generate approximately $526,000 to $5.3 million in local sales and use tax and other tax revenues from direct and multiplier effects for the County during construction and operations as

[4] Note that indirect construction output is less than local sales because a proportion of local sales are expected to be generated by retail businesses. For retail businesses, output is equivalent to the retail margin and not the value of finished goods sold, as such output estimates are less than total local sales.

shown in **Table 2**. When considering only the direct impacts, **Table A-3** shows that between $144,500 and $4.9 million in revenues will be generated locally, whereas taxable sales from indirect and induced impacts will provide about $382,000 over the course of 30 years to the County. The range for the direct impacts reflects whether or not the Project establishes a "job site" address for all materials and equipment purchases. **Table A-3** further displays the "low" scenario, which assumes no such address is established, so sales and use taxes are collected at the location of the vendor of such goods, in which case the County would not receive taxes on the bulk of the construction materials (PV panels and inverters). For the "high" scenario, it is assumed that the Project vendors and contractors would establish a "job site" address at the jobsite, and thus the County would receive sales and use taxes on all eligible purchases.

Local Sales and Use Taxes

Total estimated taxable sales generated as a result of Project development and operation is summarized in **Table A-3**. Direct taxable sales are based on the Project's projected taxable purchases. The developer may ask Project suppliers and contractors to establish a billing and delivery address at the jobsite in unincorporated Riverside County for sales tax payment on all purchases of equipment and materials for the Project's construction. Without such a "job site" address for the jobsite, only those purchases made at locations in Unincorporated Riverside County would generate sales and use taxes for the County. For comparison, EPS established both "low" and "high" results to reflect the economic impacts of both scenarios, which yield substantial differences.

Because the major cost for the Project will be PV panels and inverters that are expected to be purchased from out-of-County suppliers, establishing the "job site" address for these purchases greatly increases sales taxes for the County in the "high" scenario, since none of these purchases would generate County taxes in the "low" scenario. While required mountings and electrical equipment and materials are likely to be available from suppliers within the County, only about 17 percent of total taxable sales in the entire Riverside County (including incorporated areas) are made in the unincorporated areas. Thus, EPS has assumed that 17 percent of in-County taxable sales would be made at locations in the unincorporated area in the "low" scenario. EPS has also estimated the sales and sales tax share in the remaining jurisdictions of Riverside County, as shown in **Table A-4**.

According to JEDI, direct purchases throughout the construction phase in the entire County will yield between $114 million and $680 million in taxable sales throughout the 30-year period. Indirect taxable sales during the construction phase are based on sales of construction supplies and materials by "business-to-business" vendors (e.g., wholesalers to retailers) estimated by JEDI to amount to $36.7 million. Indirect and induced purchases would not be subject to the "job site" address, and thus are the same in the "low" and "high" scenarios. Induced annual sales are estimated by JEDI to sum to $176.3 million during the construction phase, and likewise would not change between the "low" and "high" scenarios. Additionally, taxable sales from indirect and induced economic activities during the 30-year operations period are estimated at about $3.0 million per year, with unincorporated areas anticipated to capture about 17 percent of those sales, or $525,000 annually.

The Project's impact on local sales and use tax revenue is calculated based on the estimated taxable sales, summarized in **Table A-3**. Applying the various local sales tax rates applicable to the County, this analysis estimates that development and operation of the Project will generate

about $5.2 million in local sales tax revenues prior to and during the construction phase in the "high" scenario, with $4.9 million of this revenue from direct purchases, and about $114,000 total ($3,800 annually) during operations.

Establishing a "Job Site" Address for Sales and Use Tax

According to the California State Board of Equalization, the process for establishing a "job site" address for a construction jobsite is relatively straightforward. All vendors and contractors operating in the State are required to obtain a "seller's permit" from the Board of Equalization. These seller's permits are associated with a particular address, typically the seller's physical location. However, sellers may add an address to their profile for a particular jobsite so that sales and use taxes can be applied at and reverted to that location. To do this, sellers must log onto the Board of Equalization's website (https://www.boe.ca.gov/elecsrv/ereg/) and follow the instructions to "add a new location to an existing BOE account." According to BOE staff, the process typically takes 15-20 minutes.

Retail Sales Impacts

As discussed above, the "induced" impacts of the Project are generated as employees of the Project (during construction and operations) and employees of the affected supply chain vendors spend their wages in the local economy. These employees will purchase many things for their households, including typical retail expenditures (clothing, groceries, etc.) as well as housing, healthcare, education, and other goods and services. The distribution of household spending by category tends to vary by income level, so **Table A-5** estimates the average wage of the Project's direct, indirect, and induced employees during the construction and operations periods. Note these figures differ from those on **Table 3** because they do not include the value of employee benefits, only actual wages that generate discretionary income. **Table A-6**, then, applies typical consumer expenditure pattern data from the United States Bureau of Labor Statistics, and illustrates the likely expenditures associated with employees supported directly or indirectly by the Project. As shown, the construction period is estimated to generate $71.7 million of retail sales, and the operations period may generate another $256,300 of annual retail sales. It is likely that these estimates are conservative as the average salary without benefits for the indirect and induced impacts uses JEDI's assumption that approximately 45.6 percent of total employee compensation is benefits. It is expected that jobs included in the indirect and induced analysis are not receiving such notably high benefits. Thus, the salary amount (excluding benefits) used to calculate retail spending is less than what is most probably received. Note that not all of these expenditures would be expected to occur within the Unincorporated Riverside County.

APPENDIX A

Table A-1
Estimated Total Project Spending in Riverside County During Construction and Operations
Palen PV Solar Project; EPS #171075

Cost Category	Estimated Spending	Local Capture	Est. Local Receipts
Construction Phase[1]			
Project Development and Onsite Labor Impacts	$341,754,839	100.0%	$341,754,839
Pre-Development			
Project Permitting, Planning Services, and Other Costs[2]	$233,796,729	80.8%	$188,907,757
Construction Materials[3]			
Mounting (rails, clamps, fittings, etc.)	$53,266,794	75.0%	$39,950,100
Electrical (wire, connectors, breakers, etc.)	$60,733,206	75.0%	$45,549,904
Modules[4]	$479,277,236	0.0%	$0
Inverter[4]	$87,000,000	0.0%	$0
Subtotal	**$680,277,236**	**12.6%**	**$85,500,004**
Subtotal Non-labor Construction Spending	**$914,073,966**	**30.0%**	**$274,407,762**
Total Spending/ Local Receipts During Construction	**$1,255,828,804**	**49.1%**	**$616,162,600**
Operations Phase[1]			
PV System Operating Maintenance Labor	$18,720,000	100.0%	$18,720,000
Local Revenue and Supply Chain Impacts	$7,221,657	100.0%	$7,221,657
Total Spending/ Local Receipts During Operations	$25,941,657	100.0%	$25,941,657

[1] Construction and operations materials, services, and costs are provided by JEDI.
[2] Other costs includes all services and miscellaneous costs not accounted for elsewhere. EPS has excluded "Business Overhead" costs calculated in JEDI, as those included "gross margin" factors that reflect profits rather than costs. The estimated local receipts for pre-development were derived by subtracting the subtotal (construction materials) from the subtotal non-labor construction spending. The local capture was then calculated by dividing the estimated local receipts by the JEDI estimated spending on pre-development.
[3] JEDI outputs for construction material costs were reduced by 40% based on EDF R-D's experience.
[4] EPS anticipates that modules and inverters will be purchased out of the County.

Sources: EDF Renewable Development, Inc.; JEDI PV Model; IMPLAN 2015; and Economic & Planning Systems, Inc.

Table A-2
Direct, Indirect, and Induced Economic Impacts of the Project in Riverside County
Palen PV Solar Project; EPS #171075

Project Phase	Economic Activity	Type of Impact	Employment (Job-Yrs.)	Employee Compensation	Economic Output
Construction (30 months)	Project Development	Direct Impacts	1,415	$169,234,000	$202,580,225
	Local Supply Chain Business Activity	Indirect Impacts[1, 4]	730	$87,898,649	$196,499,496
	Employee Spending	Induced Impacts[2, 4]	374	$32,443,551	$104,521,377
		Total Impacts	**2,519**	**$289,576,200**	**$503,601,098**
Operations (30 years)	Project Operations	Direct Impacts[3]	360	$18,720,000	$18,720,000
	Local Supply Chain Business Activity	Indirect Impacts[1, 4]	51	$3,461,741	$10,600,713
	Employee Spending	Induced Impacts[2, 4]	43	$2,102,912	$6,774,424
		Total Impacts	**454**	**$24,284,653**	**$36,095,138**
Total Project			**2,973**	**$313,860,853**	**$539,696,236**

[1] Indirect impacts measure the economic activity generated by business-to-business transactions that occur in the local economy in response to the initial demand from the Project.
[2] Induced impacts measure the economic activity generated by personal consumption spending of both direct and indirect employees.
[3] Direct impacts during operations assumes 12 full-time staff annually.
[4] The indirect and induced impacts for construction and operations are reduced proportionally from the JEDI estimations to account for the lower direct inputs in the model as provided by EDF.

Sources: EDF Renewable Development, Inc.; JEDI PV Model; IMPLAN 2015; and Economic & Planning Systems, Inc.

Table A-3
Local Sales Tax Revenue Estimates (2017 dollars)
Palen PV Solar Project; EPS #171075

Taxable Sales Category	Share in Unincorporated Riverside County						Share in Remaining Jurisdictions of Riverside County					
	Low[1]			High[1]			Low[1]			High[1]		
	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)
Total Direct Taxable Sales												
Construction Materials & Supplies	**$19,799,751**	**-**	**$19,799,751**	**$680,277,236**	**-**	**$680,277,236**	**$94,200,249**	**-**	**$94,200,249**	**$0**	**-**	**$0**
Indirect Taxable Sales (Supply Chain Businesses)[2]												
Construction Materials & Supplies	$6,375,863	-	$6,375,863	$6,375,863	-	$6,375,863	$30,334,111	-	$30,334,111	$30,334,111	-	$30,334,111
Operations Materials & Supplies	-	$320,074	$9,602,234	-	$320,074	$9,602,234	-	$1,522,802	$45,684,049	-	$1,522,802	$45,684,049
Induced Taxable Sales (Employee Purchases)[2]												
Construction Materials & Supplies	$30,625,108	-	$30,625,108	$30,625,108	-	$30,625,108	$145,703,486	-	$145,703,486	$145,703,486	-	$145,703,486
Operations Materials & Supplies	-	$204,545	$6,136,342	-	$204,545	$6,136,342	-	$973,152	$29,194,557	-	$973,152	$29,194,557
Total Indirect/Induced Taxable Sales	**$37,000,971**	**$524,619**	**$52,739,547**	**$37,000,971**	**$524,619**	**$52,739,547**	**$176,037,597**	**$2,495,954**	**$250,916,202**	**$176,037,597**	**$2,495,954**	**$250,916,202**

Local Sales Taxes (Direct Taxable Sales)	Tax Rate	County Share	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)
Local Sales Tax (General County Operations)	0.25%	100%	$49,499	$0	$49,499	$1,700,693	$0	$1,700,693	$235,501	$0	$235,501	$0	$0	$0
Prop 172 Public Safety Sales Tax[2]	0.50%	95%	$94,049	$0	$94,049	$3,231,317	$0	$3,231,317	$447,451	$0	$447,451	$0	$0	$0
Total Local Sales Tax Revenues (Direct)			**$143,548**	**$0**	**$143,548**	**$4,932,010**	**$0**	**$4,932,010**	**$682,952**	**$0**	**$682,952**	**$0**	**$0**	**$0**

Local Sales Taxes (Indirect/Induced Taxable Sales)	Tax Rate	County Share	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)	One-Time	Annual	Total (30 yrs.)
Local Sales Tax (General County Operations)	0.25%	100%	$92,502	$1,312	$131,849	$92,502	$1,312	$131,849	$440,094	$6,240	$627,291	$440,094	$6,240	$627,291
Prop 172 Public Safety Sales Tax[2]	0.50%	95%	$175,755	$2,492	$250,513	$175,755	$2,492	$250,513	$836,179	$11,856	$1,191,852	$836,179	$11,856	$1,191,852
Total Local Sales Tax Revenues (Indirect/Induced)			**$268,257**	**$3,803**	**$382,362**	**$268,257**	**$3,803**	**$382,362**	**$1,276,273**	**$18,096**	**$1,819,142**	**$1,276,273**	**$18,096**	**$1,819,142**

[1] High scenario assumes local sales tax capture on PV panels and inverters if project establishes a point-of-sale address for collecting sales tax on PV panels and inverters. Low scenario assumes only products actually purchased from establishments within the County generate sales taxes to the County.

[2] This revenue is under the State's jurisdiction but is dedicated to counties and cities for criminal justice activities. The County receives about 95% of the half-cent sales tax rate.

Sources: EDF Renewable Development, Inc.; IMPLAN 2015; California BOE; and Economic & Planning Systems, Inc.

Table A-4
Estimate of Project-Related Taxable Sales
Palen PV Solar Project; EPS #171075

Taxable Sales	Reference	Total Estimated Amount	Share in Unincorporated Riverside County				Remaining Jurisdictions of Riverside County			
			Low[1]		High[2]		Low[1]		High[2]	
			%	$	%	$	%	$	%	$
Construction Phase Direct Purchases[3]										
PV Modules and Inverters[4]		$566,277,236	0%	$0	100%	$566,277,236	0%	$0	0%	$0
Mounting (rails, clamps, fittings, etc.)	See Table A-1	$53,266,794	17%	$9,251,485	100%	$53,266,794	83%	$44,015,309	0%	$0
Electrical (wire, connectors, breakers, etc.)	See Table A-1	$60,733,206	17%	$10,548,266	100%	$60,733,206	83%	$50,184,940	0%	$0
Subtotal		$680,277,236	3%	$19,799,751	100%	$680,277,236	14%	$94,200,249	0%	$0
Indirect Sales (Purchases from Local Businesses)[5]		$36,709,973	17%	$6,375,863	17%	$6,375,863	83%	$30,334,111	83%	$30,334,111
Induced Construction-related Employee Sales		$176,328,594	17%	$30,625,108	17%	$30,625,108	83%	$145,703,486	83%	$145,703,486
Subtotal Construction-related Taxable Sales		**$893,315,804**	**6%**	**$56,800,722**	**80%**	**$717,278,207**	**30%**	**$270,237,845**	**20%**	**$176,037,597**
Operations Phase (Annual)										
Indirect Taxable Sales during Operations[6]		$1,842,876	17%	$320,074	17%	$320,074	83%	$1,522,802	83%	$1,522,802
Induced Operations-related Employee Sales		$1,177,697	17%	$204,545	17%	$204,545	83%	$973,152	83%	$973,152
Subtotal Operations-related Taxable Sales		**$3,020,573**	**17%**	**$524,619**	**17%**	**$524,619**	**83%**	**$2,495,954**	83%	**$2,495,954**

[1] Low scenario assumes no local sales tax capture on PV modules and inverters bought from outside of County, and 17% of mounting and electrical equipment purchased in County are in the unincorporated county capture, consistent with countywide taxable sales data from California Board of Equalization.
[2] High scenario assumes local sales tax capture on PV panels and inverters if project establishes a job-site address for collecting sales tax on PV panels, inverters, mounting and electrical equipment. Low scenario assumes only products actually purchased from establishments within the County generate sales taxes to the County.
[3] JEDI outputs for direct construction material costs (PV Modules and Inverters, Mounting, and Electrical) were reduced by 40% based on EDF R-D's experience.
[4] Estimate of solar panels and inverters provided per JEDI.
[5] Additional sales from subsequent rounds of re-spending in the Wholesale and Retail Trades, estimated using JEDI.
[6] Estimated using JEDI; reflects additional rounds of business-to-business spending on retail after initial project spending on O&M services.

Sources: EDF Renewable Development, Inc.; JEDI PV Model; IMPLAN 2015; California Board of Equalization; and Economic & Planning Systems, Inc.

Table A-5
Estimation of Wages Excluding Benefits
Palen PV Solar Project; EPS #171075

Project Phase	Economic Activity	Type of Impact	Employment (Job-Yrs.)	Employee Compensation (w/ benefits)	Compensation w/o Benefits	Weighted Average Salary
Construction (30 months)	Project Development	Direct Impacts[1]	1,415	$169,234,000	$110,370,000	$78,000
	Local Supply Chain Business Activity	Indirect Impacts[2, 5]	730	$87,898,649	$60,369,952	$82,749
	Employee Spending	Induced Impacts[3, 5]	374	$32,443,551	$22,282,658	$59,567
		Total Impacts	**2,519**	**$289,576,200**	**$193,022,610**	**$76,638**
Operations (30 years)	Project Operations	Direct Impacts[3, 4]	360	$18,720,000	$12,208,696	$33,913
	Local Supply Chain Business Activity	Indirect Impacts[2, 5]	51	$3,461,741	$2,377,569	$46,351
	Employee Spending	Induced Impacts[3, 5]	43	$2,102,912	$1,444,308	$33,709
		Total Impacts	**454**	**$24,284,653**	**$16,030,573**	**$35,299**

[1] Compensation without benefits for direct jobs comes from the IBEW Local 440 report and prior EDF R-D's project experiences.
Based on EDF R-D's assumption that benefits are approximately 53 percent of wages.
[2] Indirect impacts measure the economic activity generated by business-to-business transactions that occur in the local economy in response to the initial demand from the Project.
[3] Impacts generated by personal consumption spending of both direct and indirect employees.
[4] Direct impacts during operations assumes 12 full-time workers with an hourly wage of $25 including benefits.
Based on EDF R-D's assumption that benefits are approximately 53 percent of wages.
[5] As assumed by JEDI, 45.6 % is allocated to benefits.

Sources: EDF Renewable Development, Inc.; JEDI PV Model; IMPLAN 2015; and Economic & Planning Systems, Inc.

Table A-6
Estimation of Retail Sales
Palen PV Solar Project; EPS #171075

Retail Categories	Construction		Annual Operations	
	% of Income[1]	$	% of Income[1]	$
Average Annual Compensation		$76,638		$35,299
Total Aggregate Compensation		$193,022,610		$16,030,573
Apparel	**2.9%**	**$5,528,193**	**3.7%**	**$19,685**
General Merchandise	***3.2%***	**$6,088,272**	***4.8%***	**$25,780**
Personal Care Products	1.1%	$2,183,273	1.5%	$8,050
Reading	0.2%	$347,457	0.3%	$1,570
Tobacco	0.5%	$917,908	1.1%	$5,910
Miscellaneous	1.4%	$2,639,634	1.9%	$10,251
Food and Beverage	**12.2%**	**$23,624,468**	**16.8%**	**$89,715**
Food at Home	6.2%	$11,956,143	10.3%	$55,224
Food away from Home	5.2%	$10,099,583	5.6%	$30,182
Alcoholic Beverages	0.8%	$1,568,741	0.8%	$4,310
Housing & Building Related Merchandise	**3.9%**	**$7,535,145**	**5.1%**	**$27,073**
Housekeeping Supplies	1.0%	$1,978,429	1.6%	$8,788
Household Furnishings and Equipment	2.9%	$5,556,715	3.4%	$18,285
Automobiles	**10.7%**	**$20,614,040**	**12.0%**	**$64,305**
Vehicle Purchases	7.1%	$13,714,171	7.0%	$37,262
Gasoline and Motor Oil	3.6%	$6,899,869	5.1%	$27,042
Entertainment	**4.3%**	**$8,331,184**	**5.6%**	**$29,767**
Total Retail Expenditures	**37.2%**	**$71,721,301**	**48.0%**	**$256,325**

[1] Percent of income spent on various retail categories is based on Bureau of Labor Statistics data regarding typical consumer expenditures for households earning the average compensation calculated for this project.

Sources: U.S. BLS Consumer Expenditure Survey (2015) and Economic and Planning Systems, Inc.