CalEEMod Emission Summary

TO: Samuel Juarez, EPDS
FROM: Vince Mirabella
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SUBJECT: Summary of Air Quality/Greenhouse Gas/Energy Analysis for the North Coast Highway Solar Project

SECTION 1: PROJECT INFORMATION

1.1 - Project Name

North Coast Highway Solar Project (Project)

1.2 - Project Location

The Project is located within the Hydesville Community Plan of unincorporated Humboldt County, California, near County Route 36 and River Bar Road. Access to the site is provided by County Route 36.

1.3 - Project Description

The Project would install and operate photovoltaic solar power generation facilities totaling approximately 2.8 MWac (subject to final design and site optimization) on approximately 12 acres of undeveloped land. The solar facility would include single-axis trackers, arrays of solar panels, string inverters, transformers, and associated electrical equipment to optimize efficiency and performance. Single-axis trackers are designed to rotate the arrays in the east-to-west plane to track the sun's movement across the horizon. The ground-mounted arrays would be supported on driven pipe piles, driven H-piles, or reinforced-concrete cast-in-drilled-hole (CIDH) piers, with the foundation design to be finalized following completion of onsite geotechnical surveys and structural engineering. Once installed, the ground-mounted solar arrays would be up to approximately 8 feet in height, depending on the time of day to which a tracking system is utilized. The Project would include the installation of approximately 4,800 modules on ground-mounted solar arrays within the two areas that would convert sunlight to direct current (DC) electrical power. The DC power would then be converted to alternating current (AC) by string inverters before being delivered to the electrical system.

The power generated by the solar system and battery would be exported onto the Pacific Gas and Electric Company's (PG&E) existing electricity grid. The energy produced will feed into PG&E's system and, at times, may flow back into the transmission system. The Project would largely rely upon PG&E's existing wires and poles, so construction outside the project area would be minimal. A pole-mounted computer-controlled switch would be used to disconnect and reconnect the microgrid from the PG&E grid when the islanded microgrid operation is required due to a PG&E outage or another reason. The pole-mounted switch would be mounted on an existing power pole on the 12 kV power line on SR-36, along with the battery and power conversion devices.

After construction, the facility would be automated to allow operation with no onsite staffing present. The Project would operate year-round and generate electricity during daylight hours. Production and system health data and onsite weather data would be monitored and gathered electronically. Washing of the solar panels, which would be necessary to maintain efficiency, is anticipated to occur approximately two times per year. Such maintenance would require temporary staffing onsite and using a water truck. Additionally, maintenance staff would visit the site as needed when dispatched by the offsite operations center, which would continuously monitor the system.

The Project's onsite solar operations would run for approximately 20 years, which is the duration of the Power Purchase Agreement (PPA) with PG&E. During that period, some components such as the battery and power conversion devices may need to be replaced. Regular maintenance items over the system's life will include washing the dust off the panels during the summer and managing vegetation.

1.4 - Purpose of the Report

This report summarizes the results of the Project construction and operational criteria pollutant and greenhouse gas (GHG) emissions and energy usage estimates using the California Emissions Estimator Model (CalEEMod Version 2022.1) land use emission model. The estimated Project emissions were compared to the air quality and GHG significance thresholds recommended by the North Coast Unified Air Quality Management District (NCUAQMD).

1.5 - Conclusions

- The Project construction and operation would not exceed any project-level criteria pollutant significance threshold recommended by the NUAQMD.

- The Project construction and operation would not result in a cumulatively significant impact on the region's air quality.

- The Project construction and operation would not exceed the greenhouse gas significance threshold adopted for this Project.

- The Project operation would create renewable energy over its planned lifetime and decrease the need for energy from fossil fuel–based power plants in the State, which is considered a beneficial impact on statewide air quality. The energy produced by the Project would displace the greenhouse gas emissions that would otherwise be produced by existing business-as-usual (power generation resources (including natural gas fuel oil, and coal).

- The Project construction and operation would not result in the wasteful, inefficient, and unnecessary consumption of energy, especially fossil fuels such as coal, natural gas, and petroleum, associated with Project design, Project location, the use of electricity and natural gas, and the use of fuel by vehicles anticipated to travel to and from the Project. As a renewable solar resource, the Project would result in a net reduction of energy produced by more traditional fossil fuel energy sources.

SECTION 2: CALEEMOD EMISSION ESTIMATES – CRITERIA POLLUTANTS

The Project is located within the North Coast Air Basin (NCAB) and is subject to the rules and regulations of the NCUAQMD. This section quantifies the Project construction and operational criteria pollutant emissions[1] for the Project design and compares the emissions to the significance thresholds recommended by the NCUAQMD.

2.1 - Significance Thresholds-Criteria Pollutants

In developing thresholds of significance for air pollutants, Appendix G of the State CEQA Guidelines requires that agencies consider the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Conversely, a project that does not exceed the relevant significance thresholds would not be considered cumulatively considerable, resulting in a less than significant adverse air quality impact to the region's existing air quality conditions.

The NCUAQMD has not established significance criteria applicable to Projects such as the North Coast Highway Solar Project. Instead, the NCUAQMD uses the Best Available Control Technology (BACT) emission rates for stationary sources as defined in NCUAQMD Rule 110 and listed in Table 1 as significance thresholds. The thresholds were assumed to apply for both construction and operations. Note that only a subset of pollutants shown in Table 1 is relevant to the Project. The Project is not expected to generate any significant amounts of fluorides, hydrogen sulfide, lead, reduced sulfur compounds, sulfur oxides, sulfuric mist, and total reduced sulfur compounds.

Table 1: NCUAQMD Air Quality CEQA Significance Thresholds

Air Pollutant	Daily Emissions (pounds/day)	Maximum Annual Emissions (tons/year)
Oxides of Nitrogen (NO_x)	50	40
PM_{10}	80	15
$PM_{2.5}$	50	10
Reactive Organic Gases (ROG)	50	40
Carbon Monoxide (CO)	500	100
Hydrogen Sulfide (H_2S)	50	10
Lead	3.2	0.6
Reduced Sulfur Compounds	50	10
Sulfur Oxides	80	40
Sulfuric Acid Mist	35	7

[1]Criteria pollutants are the only air pollutants with national air quality standards that define allowable concentrations of these substances in the ambient air. Criteria pollutants include carbon monoxide (CO), oxides of nitrogen (NO_x), sulfur dioxide (SO_x), and particulate matter (PM_{10} and $PM_{2.5}$). Note that ozone is another criteria pollutant; however, in terms of defining significance thresholds, ozone is represented by its precursor components, oxides of nitrogen (NO_x) and reactive organic gases.

Air Pollutant	Daily Emissions (pounds/day)	Maximum Annual Emissions (tons/year)
Total reduced Sulfur Compounds	50	10
Fluorides	15	2
Source: NCUAQMD Rule 110[2]		

2.2 Project Criteria Pollutant Emissions

Project Construction Emissions

Construction-generated emissions are short-term and of temporary duration, lasting only as long as construction activities occur. However, such emissions can potentially represent a significant short-term air quality impact. Construction emissions can vary substantially from day to day, depending on the activity level, the specific type of operation, and prevailing weather conditions. The majority of construction emissions would be generated onsite by heavy-duty off-road equipment (such as backhoes, bulldozers, graders, front loaders, water trucks, and forklifts) used for site preparation, construction of access roads, installation of the solar array, construction of the inverter sites, substations, and generation tie lines. Exhaust emissions would also be generated by construction worker daily commutes and by heavy-duty diesel vendor and haul truck trips that transport materials to the Project site

Heavy construction equipment would be moved onsite at the beginning of construction and would remain onsite as needed. Daily vehicle traffic is anticipated to be made up of worker passenger cars/light-duty trucks and heavy-duty flatbed delivery trucks, dump trucks, concrete delivery trucks, water trucks, and porta let trucks. The highest number of trips would likely be from construction workers traveling to and from the site each day. The number of workers required during each phase has been estimated based on the number of workers and construction equipment required to construct similar solar projects[3].

The Project site is located in a rural area, relatively distant from large population centers. As a result, the default vehicle trip distances used by the CalEEMod model for worker vehicles, vendor vehicles, and delivery haul trucks were modified to reflect longer trip travel distances involved in the Project construction. The emission analysis assumed a 50-mile round-trip travel distance for vendor and worker vehicles, a distance that includes the cities of Fortuna, Eureka, and Arcata as potential locations for workers and supplies. The flatbed haul trucks transporting the solar panels and other major equipment during the Panel Installation and Connection construction phase were assumed to travel to and from the San Francisco Bay Area at a round-trip distance of 400 miles.

Fugitive dust emissions during Project construction would result from site grading, installation of the solar panel system foundation and related equipment, installation of inverters, transformers, and substation electrical collector system, and vehicle travel on unpaved and paved roads. Mitigating onsite fugitive dust would be accomplished by applying mitigation measures covered under NCUAQMD Rule 104, Section D: Fugitive Dust Emissions.

[2] NCUAQMD Rule 110, 2015. New Source Review (NSR) and Prevention of Significant Deterioration (PSD). Website: http://www.ncuaqmd.org/files/rules/reg%201/Rule%20110.pdf

[3] Urban Crossroads 2018. Anderson Gates Project (1MWSolar Project). Anderson Gates Focused Air Quality and Greenhouse Gas Memorandum. Submitted to EPD Solutions.

Assumption**s**

- Construction Schedule: Construction is anticipated to commence in April 2024 and last for approximately four months.

- Project construction would consist of three major phases:

    - Phase 1 – Mobilization (erosion control, if necessary, stabilized construction entrances and exits, fencing and gates, transport of off-road construction equipment, and communication/security systems)

    - Phase 2 – Site improvements and grading (surface smoothing and grading preparation of solar foundations and internal access roads)

    - Phase 3 – Panel Installation and connection (placement of underground electrical and communication lines, transformers, substation systems, concrete for foundations and equipment pads, support structures (posts), cross-members and other hardware, electrical connections and equipment, photovoltaic modules, and final inspections and testing and startup)

- The Project site is currently vacant.

- Onsite grading is expected to be balanced, with no soil import or export required.

- Fugitive dust mitigation applied as per NCUAQMD Rule 104(D) – Fugitive Dust: (Application of watering exposed area 2 times per day)

- Construction equipment inventory was derived from similar solar development projects

- Exhaust from on-road construction vehicles, including worker vehicles, cement trucks, dump trucks, porta latrine trucks, and flatbed heavy-duty delivery trucks to deliver major equipment items such as solar panels, support members, inverters, wiring, and other construction materials

The Project's conceptual construction schedule and equipment inventory are provided in Table 2 and Table 3, respectively, based on the applicant construction schedule and equipment inventory provided by the applicant and used in similar projects. Table 4 presents the Project's construction vehicle trips based on the trip estimates in the Project trip generation memorandum[4].

Table 2: Construction Schedule

Phase	Start Date	End Date	Total Construction Days
Mobilization	04/01/2024	04/02/2024	15
Site Improvements and Grading	04/21/2024	05/10/2024	15
Panel Installation and Connection	05/11/2024	07/05/2024	40
Source: see Data Attachment			

[4]Trip Generation Analysis for North Coast Highway Solar Project, EPDS 3/1/2023

Table 3: Construction Equipment Inventory

Phase	Equipment	Project Number	Project Hours per day	Default Horse-power	Default Load Factor
Mobilization	Grader	1	8	148	0.41
	Off-highway Truck	1	4	376	0.38
	Rubber Tired Loader	1	8	150	0.36
	Rough Terrain Forklift	1	8	96	0.40
Site Improvement	Excavator	2	8	36	0.38
	Rubber Tired Dozer	2	8	367	0.40
	Off-Highway Truck	1	6	376	0.38
	Grader	1	8	148	0.41
	Scraper	1	8	423	0.48
	Roller	1	8	36	0.38
	Paver	1	8	81	0.42
Panel Installation and Connection	Bore/Drill Rig	2	8	46	0.45
	Rough Terrain Forklift	1	8	96	0.40
	Welder	1	4	46	0.45
	Tractor/Loader/Backhoe	2	8	84	0.37
	Generator Set	1	8	14	0.74
	Air Compressor	1	8	37	0.48
Source: see Data Attachment					

Table 4: Construction Vehicle Trips

Phase	Construction One Way Trips per Day		
	Worker	Vendor	Haul(*)
Mobilization	30	2	6
Site Improvement	70	2	6
Panel Installation and Connection	120	2	8
Note: One additional HHDT (water truck) was added to the trip generation summary from EPDS for each construction phase Source: Trip Generation Analysis for North Coast Highway Solar Project, EPDS 3/1/2023			

Table 5 presents the Project's estimated maximum daily construction emissions. As noted in Table 5, the Project construction would not exceed the NCUAQMD's daily emission significance thresholds. Table 6 presents the results of the Project's annual construction emissions. Table 6 shows that the Project construction would not exceed the NCUAQMD's annual construction emission significance thresholds and would, therefore, not result in a significant impact during construction

Table 5: Maximum Daily Construction Emissions

Phase	Maximum Daily Construction Emissions[1] (pounds/day)					
	ROG	NO_X	C0	SO_x	PM_{10}	$PM_{2.5}$
2024						
Mobilization	1.2	9.3	14.0	0.0	1.3	0.5
Site Improvement	4.7	40.7	42.1	1.7	8.9	4.6
Panel Installation and Connection	2.1	17.9	26.4	0.1	4.1	1.3
Maximum Daily Emissions – 2024	**4.7**	**40.7**	**42.1**	**1.7**	**8.9**	**4.6**
NCUAQMD Significance Thresholds	**50**	**50**	**500**	**80**	**80**	**50**
Emissions Exceed Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
ROG = reactive organic gases NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns or less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns or less in diameter CO = carbon monoxide SO_x = sulfur oxides
PM emissions reflect NCUAQMD Rule 104(D) reductions for fugitive dust.
Source: see Data Attachment

Table 6: Annual Construction Emissions

Phase	Annual Construction Emissions[1] (tons/year)					
	ROG	NO_X	C0	SO_x	PM_{10}	$PM_{2.5}$
2024						
Mobilization	<0.1	0.1	0.1	<0.1	<0.1	<0.1
Site Improvement and Grading	<0.1	0.3	0.3	<0.1	0.1	<0.1
Panel Installation and Connection	<0.1	0.4	0.5	<0.1	0.1	<0.1
Annual Emissions - 2024	**0.1**	**0.8**	**1.0**	**<0.1**	**0.2**	**0.1**
NCUAQMD Significance Thresholds	**40**	**40**	**100**	**40**	**15**	**10**
Emissions Exceed Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
ROG = reactive organic gases NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns or less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns or less in diameter CO = carbon monoxide SO_x = sulfur oxides
PM emissions reflect NCUAQMD Rule 104(D) reductions for fugitive dust.
Source: see Data Attachment

Project Operational Emissions

After construction, emissions would be generated from the long-term operation and maintenance of the Project involving onsite equipment and onsite and offsite vehicle use. Operation and maintenance activities would include solar panel washing, vegetation, weed and pest management, and security. Maintenance activities would also include panel repairs, maintenance of transformers, inverters, and other electrical equipment as needed, and road and fence repairs.

Project operation would require significantly fewer vehicle trips than generated during the construction phase. The Project would not be permanently staffed during operation. Production and system health data and onsite weather data would be monitored and gathered electronically remotely. Washing of the solar panels, which would be necessary to maintain efficiency, is anticipated to occur approximately twice yearly. Such maintenance would require temporary staffing onsite and the use of a water truck.

Additionally, maintenance staff would visit the site as needed when dispatched by the offsite operations center, which would continuously monitor the system. No heavy equipment would be required during the maintenance activities. The maintenance vehicle travel was assumed to be by light-heavy-duty diesel trucks with a round-trip travel distance of 50 miles.

Table 7 summarizes the Project's daily operational emissions along with a comparison to the NCUAQMD's significance thresholds. The Project's operational emissions include exhaust and fugitive dust emissions from onsite and offsite vehicle usage. As noted in Table 7, the Project's daily operational emissions are less than the respective significance thresholds. Table 8 provides the results of the annual operational emissions along with a comparison to the NCUAQMD annual significance thresholds. Table 8 shows the Project's annual operational emissions as substantially less than the NCUAQMD annual significance thresholds.

Table 7: Maximum Daily Operational Emissions

Operational Activity	Maximum Daily Operational Emissions (pounds/day)				
	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Total Project Operational Emissions	**0.3**	**3.1**	**0.8**	1.4	0.2
NCUAQMD Significance Threshold	**50**	**50**	**500**	**80**	**80**
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**

Notes:
NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns or less in diameter ROG = reactive organic gases
$PM_{2.5}$ = particulate matter 2.5 microns or less in diameter CO = carbon monoxide
Source: see Data Attachment

Table 8: Annual Operational Emissions

Operational Activity	Annual Operational Emissions (tons/year)				
	ROG	NOx	CO	PM_{10}	$PM_{2.5}$
Total Project Operational Emissions	0.2	<0.1	<0.1	<0.1	<0.1
NCUAQMD Significance Threshold	40	40	100	15	10
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**

Notes:
NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns or less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns or less in diameter CO = carbon monoxide
Source: see Data Attachment

Project Decommissioning

The Project's onsite solar operations would run for approximately 20 years, the Power Purchase Agreement (PPA) duration with PG&E. At such a time when the Project is decommissioned, equipment operation and site restoration activities would result in short-term impacts on air quality. Given the assumption that much of the construction equipment necessary to construct the Project would also be required to decommission the site, it is reasonable to assume that decommissioning activities would be similar to activities associated with the Project construction. Note that this does not consider any future improvement in technology or subsequent reductions in air emissions. Project decommissioning is projected to be shorter in duration than construction and take one month to complete instead of 4 months for construction. Therefore, decommissioning is assumed to be one-quarter of the estimated construction emissions. The estimated decommissioning emissions, therefore, would not exceed any NCUAQMD daily or annual operational emissions significance thresholds.

2.2.2 Cumulative Impacts

Construction

As shown in Table 5 and Table 6 above, the Project's maximum daily and annual construction emissions would not exceed NCUAQMD's significance thresholds. Therefore, the Project's construction emissions would not result in a cumulatively considerable incremental contribution to the existing air quality. Furthermore, all construction activities would comply with applicable NCUAQMD rules and regulations, including Rule 104(D) to minimize fugitive PM dust emissions. Therefore, the cumulative impact of the Project construction would be less than significant.

Operations

Table 7 and 8 above show that the Project's maximum daily operational and annual emissions would not exceed NCUAQMD's significance thresholds. Therefore, the Project's operational emissions would not result in a cumulatively considerable incremental contribution to the existing air quality. The cumulative impact from the long-term Project operation would be less than significant.

2.2 - Conclusion

The Project's construction and operational emissions would not exceed the NCUAQMD's established project level or cumulative pollutant significant thresholds during either construction or operation.

SECTION 3: CALEEMOD EMISSION ESTIMATES - GREENHOUSE GAS EMISSIONS

This section analyzes the potential impacts on climate change from the Project's emissions of various greenhouses (GHG). Solar projects, such as the proposed Project, produce electricity with no GHG emissions at the point of generation and very low amounts of GHG emissions across their entire lifecycle. The GHG emissions associated with the Project would be generated from short-term construction activities and long-term operational emissions from occasional maintenance activities.

Construction and operational activities associated with the Project would produce carbon dioxide (CO2) emissions. It is general practice to divide the total construction greenhouse gas emissions by the project life (a 20-year project life for the subject Project) and then add that number to the annual operational phase GHG emissions to obtain the total amount of GHG emissions attributable to the Project. The Project's GHG emissions were estimated using the CalEEMod land use emission model, the California Air Resources Board (ARB) EMFAC2021 mobile source emission model, and the OFFROAD 2021 emission model..

3.1 - Significance Threshold

The NCUAQMD has not recommended GHG significance thresholds for evaluating development projects subject to CEQA review. However, on July 9, 2015, the NCUAQMD adopted Rule 111 to evaluate stationary sources subject to New Source Review and federal Title V permitting requirements. In accordance with this rule, stationary sources that emit less than 25,000 tons per year of CO_2e are exempt from determining compliance. This threshold is intended for determining compliance with federal Title V stationary source permitting requirements and is typically not recommended for evaluating GHG emissions for projects subject to CEQA review.

In the absence of quantitative significance thresholds in NCUAQMD, this analysis considers other thresholds adopted in nearby jurisdictions. For example, the ARB Mandatory Reporting[5] program requirements are triggered for sources of GHG emissions exceeding 2,500 $MTCO_2e$ per year. Other prominent air districts in northern California, such as the Sacramento Metropolitan Bay Area Air Quality Management District (SMAQMD)[6] and the Mendocino County Air Quality Management District (MCAQMD)[7] have established project-level thresholds of 1,100 $MTCO_2e$ per year. This latter threshold was developed to ensure at least 90 percent of the new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to the GHG emissions reduction goals for the California Air Resources Board AB32, SB32, the Scoping Plan, and Executive orders as related to GHG policies and regulations.

[5]California Air Resources Board. Mandatory Reporting of Greenhouse Gas Emissions 2018. Webpage: https://ww2.arb.ca.gov/rulemaking/2018/mandatory-reporting-greenhouse-gas-emissions-2018

[6] Sacramento Metropolitan Air Quality Management District (SMAQMD) 2018. CEQA Guide:Chapter 6 – Greenhouse Gas Emissions

[7] MCAQMD 2010. Adopted Air Quality CEQA thresholds of Significance – June 2, 2010. Webpage: http://www.co.mendocino.ca.us/aqmd/pdf_files/MCAQMDCEQARecomendations.pdf

Therefore, Project GHG emissions were compared to the SMAQMD's and MCAQMD's GHG threshold of 1,100 $MTCO_2e$ per year for land use development projects to provide a context to determine the significance of the Project's GHG construction and operational emissions. Accordingly, a land use development project with operational emissions of less than 1,100 $MTCO_2e$ per year will not result in a significant impact and will not require additional mitigation.

3.2.1 Construction

Table 9 summarizes the Project's construction GHG emissions. NCUAQMD does not provide specific guidance regarding construction emissions. Therefore, total construction-generated GHG emissions were conservatively amortized over the estimated development life and included with operational emissions for comparison to the significance threshold. A life of 20 years was assumed for the proposed Project based on the purchase power agreement with PG&E. As noted in Table 9, the annual amortized construction GHG emissions attributable to the Project is 14 $MTCO_2e$ per year.

Table 9: Project Construction GHG Emissions

Activity	Annual GHG Emissions ($MTCO_2e$)
2024	270
Total Emissions Amortized Over 20 years	14
Source: see DataAttachment	

3.2.2 Operations

Table 10 summarizes the Project's operational GHG emissions, along with the construction GHG emissions and the total Project GHG emissions. The Project would result in GHG emissions of 16 $MTCO_2e$ per year (including the amortized construction GHG emissions). This level of emissions does not exceed the 1,100 $MTCO_2e$ per year significance threshold adopted for this Project. Therefore, the Project would have a less than significant individual and cumulative impacts on GHG emissions.

Table 10: Project Operational GHG Emissions

Activity	Annual GHG Emissions ($MTCO_2e$)
Project Operational Emissions Mobile	2
Project Construction Emissions	14
Project Construction and Operation	16
Significance Threshold	**1,100**
Project Exceeds Threshold?	**NO**
Source: see CalEEMod output	

3.2.3 Net-Zero Threshold

The Project would result in emissions of 16 $MTCO_2e$ per year from construction and operation. On an annual basis, the Project would generate 2,906 megawatt-hours (MWh). PG&E operates two large combined-cycle generating stations that burn natural gas (Colusa Generating Station and Gateway Generating Station). In 2019, these fossil-fueled facilities' average GHG emission rate was 870 pounds of CO_2e/MWh[8]. Assuming the energy produced by the Project displaces the equivalent amount of energy generated by the natural gas generation stations, the Project would displace a net reduction in GHG emissions of 1,134 $MTCO_2e$ per year. Over the 20-year Project lifetime, the net displacement of GHG emissions would potentially be 22,687 $MTCO_2e$. Table 11 summarizes this information.

Table 11: Net Displacement of GHG Emissions

Activity	GHG Emissions ($MTCO_2e$)
Project GHG Emissions	16/year
Displaced Power from PG&E	1,150 per year
Net GHG Emissions from Project	(1,134/year)
Net GHG Emissions from Project	(22,687/20-years)
Source: see Data Attachment	

3.2 - Conclusion

The Project's construction and operational GHG emissions would have a less than significant individual and cumulative impact for GHG emissions. The operation of the Project would also result in a net reduction in GHG emissions in the region.

[8] PG&E Climate Change, Chapter 11 Update; Webpage: https://www.pgecorp.com/corp_responsibility/reports/2019/en02_climate_change.html

SECTION 4: PROJECT FUEL AND ENERGY CONSUMPTION

4.1 - Assumptions

- Construction equipment fuel consumption derived from ARB Offroad2021 emission model and the assumed construction equipment inventory
- Fuel Consumption from vehicle travel derived from ARB EMFAC2021 emission model
- Onsite Project operations are expected to require negligible energy requirements.

4.2 - Significance Thresholds

Neither Appendix F of the State CEQA Guidelines nor PRC Section 21100(b)(3)) provides a numerical threshold of significance that might be used to evaluate the potential significance of energy consumption of a proposed project. Instead, the emphasis is on reducing "the wasteful, inefficient, and unnecessary consumption of energy." Based on this focus of the guidelines, and for purposes of this report, the Project would have a significant impact related to energy consumption if it would:

- Involve the wasteful, inefficient, and unnecessary consumption of energy, especially fossil fuels such as coal, natural gas, and petroleum, associated with project design, project location, the use of electricity and natural gas, and the use of fuel by vehicles anticipated to travel to and from the Project.

4.3 - Construction

4.3.1 Electricity and Natural Gas Usage

PG&E would provide temporary electric power for as-necessary lighting and electronic equipment such as computers inside temporary construction trailers. The electricity used for such activities would be temporary and would have a negligible contribution to the Project's overall energy consumption.

Natural gas is not anticipated to be required during the Project construction or operation. Fuels used during the construction would primarily consist of diesel and gasoline, discussed below under Section 4.3.2 Petroleum Fuel Use below.

4.3.2 Petroleum Fuel Usage

Off-road heavy-duty construction equipment associated with construction activities would rely on diesel fuel as would vendor and haul trucks involved in delivering building materials. Construction workers would travel to and from the Project site throughout the duration of construction. It is assumed in this analysis that construction workers would travel to and from the site in gasoline-powered passenger vehicles. Table 12 presents the fuel usage for off-road construction equipment. These estimates are based on the total fuel consumption and horsepower-hour data contained within the ARB OFFROAD2021 emission model for specific types of diesel construction equipment to be employed in the Project construction. Note that the total fuel consumption during construction computed below likely substantially overstates the amount of fuel usage. Although construction equipment and their duration are listed under a particular construction

activity, there is a likelihood that all of the inventoried equipment would not operate over the entire duration of the construction activity.

Table 13 summarizes the Project's construction vehicle fuel usage. The fuel usage is based on the vehicle type (worker, vendor, and haul trucks), vehicle miles traveled, and fuel usage factors contained in the ARB EMFAC2021 mobile source emission model and the CalEEMod model. Table 14 summarizes the total fuel construction during construction.

4.4 - Operational Energy Requirements

Table 15 summarizes the Project's operational energy requirements. The energy and fuel usage would result from the maintenance vehicles that would periodically visit the site and the energy requirements to wash the panels twice per year.

4.5 - Conclusion

Project Construction would result in fuel consumption from using construction tools and equipment, vendor and haul truck trips, and vehicle trips generated by construction workers traveling to and from the site. Construction activities and corresponding fuel energy consumption would be temporary and localized, as diesel fuel and heavy-duty equipment would not be a typical operational condition of the Project. Also, there are no unusual Project characteristics that would cause the use of construction equipment that would be less energy efficient compared with other similar construction sites in other parts of the State. The rational goal of any construction job, whether for a household task or construction project such as the proposed Project, is to minimize construction costs while meeting all legal requirements. Therefore, the Project construction-related fuel consumption would not result in inefficient, wasteful, or unnecessary energy use compared with other regional construction sites.

The Project operation would involve the development of a 2.8 MWac renewable solar energy facility. According to CEQA Guidelines Appendix F, the goal of conserving energy implies the wise and efficient use of energy, including decreasing overall per capita energy consumption, reducing reliance on natural gas and oil, and increasing reliance on renewable energy sources. The Project would comply with all energy efficiency requirements under all applicable State, county, and local business and energy code ordinances. In addition, the renewable energy produced by the Project would displace high-polluting energy provided by fossil-fuel energy sources, thereby reducing reliance on natural gas and oil, and increasing reliance on renewable energy sources. Finally, the renewable energy provided by the Project would result in a net reduction of greenhouse gas emissions compared to an equal amount of energy generated by an equivalent-sized fossil-fueled (natural gas) generator. As a result, the Project operation would not result in inefficient, wasteful, or unnecessary energy use.

Table 12: Construction Equipment Fuel Usage

Activity	Equipment	Project Number	Project Hours per day	Default Horse-power	Default Load Factor	Days of Construction	Total Horsepower-hours	Fuel Rate (gal/hp-hr)	Fuel Use (gallons)
Mobilization	Off-Highway Trucks	1	4	376	0.38	15	8,573	0.0198	170
	Graders	1	8	148	0.41	15	7,282	0.02115	154
	Rubber Tired Loader	1	8	150	0.36	15	6,480	0.018658	121
	Rough Terrain Forklift	1	8	96	0.4	15	4,608	0.020817	96
Site Improvements	Excavator	2	8	36	0.38	15	3,283	0.019664	65
	Rubber Tired Dozer	2	8	367	0.4	15	35,232	0.020440	720
	Off-Highway Truck	1	6	376	0.38	15	12,859	0.019800	255
	Graders	1	8	148	0.41	15	7,282	0.021152	154
	Scraper	1	8	423	0.48	15	24,365	0.024985	609
	Paver	1	8	81	0.42	15	4,082	0.020817	85
	Rollers	1	8	36	0.38	15	1,642	0.019412	32
Panel Installation and Connection	Bore/Drill Rigs	2	8	46	0.45	40	13,248	0.025673	340
	Rough Terrain Forklift	1	8	96	0.4	40	12,288	0.020817	256
	Tractors/Loaders/Backhoes	2	8	84	0.37	40	19,891	0.023965	477
	Welders	1	4	46	0.45	40	3,312	0.023965	79
	Air Compressor	1	8	37	0.48	40	5,683	0.023965	136
	Generator Set	1	8	14	0.74	40	3,315	0.023965	79
OFFROAD 2021, California Statewide for 2024								Total	3,503

Table 13: Estimated Project Construction Vehicle Fuel Usage

Construction Source	Gallons of Diesel Fuel	Gallons of Gasoline Fuel
Haul Trucks	11,592	0
Vendor Trucks	485	0
Worker Vehicles	0	6,009
Construction Vehicles Total	12,077	6,009
Source: see DataAttachment		

Table 14: Total Construction Fuel Usage

Construction Source	Gallons of Diesel Fuel	Gallons of Gasoline Fuel
Construction Vehicles	12,077	0
Off-road Construction Equipment	3,503	0
Construction Total	15,580	6,009
Source: see Data Attachment		

Table 15: Project Annual Operational Energy Requirements

Operational Source (value per year)		
	Annual VMT	Gallons of Fuel
Transportation – Project	2,277	153 (DSL)
Source: see Data Attachment		

CalEEMod Model Spreadsheet Output

North Coast Highway Solar Project Detailed

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7.6. Health & Equity Custom Measures

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	North Coast Highway Solar Project
Lead Agency	Humboldt
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.90
Precipitation (days)	56.8
Location	40.54509156431706, -124.11815102069
County	Humboldt
City	Unincorporated
Air District	North Coast Unified APCD
Air Basin	North Coast
TAZ	115
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Land Area (sq ft)
User Defined Industrial	12.0	User Defined Unit	12.0	0.00	0.00	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.57	4.69	40.7	42.0	0.09	1.72	7.15	8.86	1.58	3.03	4.61	—	9,885
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.56	0.47	4.03	5.25	0.01	0.13	0.71	0.84	0.12	0.23	0.35	—	1,590
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.10	0.08	0.74	0.96	< 0.005	0.02	0.13	0.15	0.02	0.04	0.06	—	263
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	50.0	50.0	500	80.0	—	—	80.0	—	—	50.0	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	50.0	50.0	500	80.0	—	—	80.0	—	—	50.0	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—

Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	40.0	40.0	100	40.0	—	—	15.0	—	—	10.0	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	5.57	4.69	40.7	42.0	0.09	1.72	7.15	8.86	1.58	3.03	4.61	—	9,885
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.56	0.47	4.03	5.25	0.01	0.13	0.71	0.84	0.12	0.23	0.35	—	1,590
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.10	0.08	0.74	0.96	< 0.005	0.02	0.13	0.15	0.02	0.04	0.06	—	263

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12	0.94	7.98	10.5	0.02	0.37	—	0.37	0.34	—	0.34	—	2,092
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.02	0.02	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.33	0.43	< 0.005	0.02	—	0.02	0.01	—	0.01	—	86.0
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.06	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	14.2
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.26	0.22	0.35	3.38	0.00	0.00	0.53	0.53	0.00	0.12	0.12	—	554
Vendor	0.01	0.01	0.21	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	161
Hauling	0.02	0.01	0.75	0.11	0.01	0.01	0.14	0.15	0.01	0.04	0.05	—	549
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.14	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	22.8
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.60
Hauling	< 0.005	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	22.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.77
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.09
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.74

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.96	4.17	38.9	34.0	0.06	1.70	—	1.70	1.57	—	1.57	—	6,956

Dust From Material Movement	—	—	—	—	—	—	5.73	5.73	—	2.69	2.69	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.17	1.60	1.40	< 0.005	0.07	—	0.07	0.06	—	0.06	—	286
Dust From Material Movement	—	—	—	—	—	—	0.24	0.24	—	0.11	0.11	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.29	0.25	< 0.005	0.01	—	0.01	0.01	—	0.01	—	47.3
Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.60	0.51	0.81	7.90	0.00	0.00	1.24	1.24	0.00	0.29	0.29	—	1,292
Vendor	0.01	0.01	0.21	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	161
Hauling	0.02	0.01	0.75	0.11	0.01	0.01	0.14	0.15	0.01	0.04	0.05	—	549

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Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.04	0.33	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	53.1
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.60
Hauling	< 0.005	< 0.005	0.03	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	22.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.80
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.09
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.74

3.5. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31	1.09	9.08	12.2	0.02	0.33	—	0.33	0.30	—	0.30	—	1,739
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.12	1.00	1.34	< 0.005	0.04	—	0.04	0.03	—	0.03	—	191

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.18	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	31.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	1.02	0.87	1.39	13.5	0.00	0.00	2.12	2.12	0.00	0.50	0.50	—	2,215
Vendor	0.01	0.01	0.21	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	161
Hauling	0.11	0.08	7.18	0.60	0.07	0.11	1.45	1.55	0.11	0.41	0.51	—	5,770
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.16	1.52	0.00	0.00	0.22	0.22	0.00	0.05	0.05	—	243
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	17.6
Hauling	0.01	0.01	0.79	0.07	0.01	0.01	0.15	0.17	0.01	0.04	0.05	—	632
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.28	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40.2
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.92
Hauling	< 0.005	< 0.005	0.14	0.01	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	105

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequest	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Wo
Mobilization	Site Preparation	4/1/2024	4/20/2024	5.00	15.
Site Improvements	Grading	4/21/2024	5/10/2024	5.00	15.
Panel Installation	Building Construction	5/11/2024	7/5/2024	5.00	40.

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day
Site Improvements	Excavators	Diesel	Average	2.00	8.00
Site Improvements	Rubber Tired Dozers	Diesel	Average	2.00	8.00
Panel Installation	Bore/Drill Rigs	Diesel	Average	2.00	8.00
Site Improvements	Off-Highway Trucks	Diesel	Average	1.00	6.00
Panel Installation	Rough Terrain Forklifts	Diesel	Average	1.00	8.00
Site Improvements	Graders	Diesel	Average	1.00	8.00
Panel Installation	Welders	Diesel	Average	1.00	4.00

Panel Installation	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00
Site Improvements	Scrapers	Diesel	Average	1.00	8.00
Site Improvements	Rollers	Diesel	Average	1.00	8.00
Mobilization	Graders	Diesel	Average	1.00	8.00
Mobilization	Off-Highway Trucks	Diesel	Average	1.00	4.00
Mobilization	Rubber Tired Loaders	Diesel	Average	1.00	8.00
Panel Installation	Generator Sets	Diesel	Average	1.00	8.00
Panel Installation	Air Compressors	Diesel	Average	1.00	8.00
Mobilization	Rough Terrain Forklifts	Diesel	Average	1.00	8.00
Site Improvements	Pavers	Diesel	Average	1.00	8.00

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip
Mobilization	—	—	—
Mobilization	Worker	30.0	25.0
Mobilization	Vendor	2.00	25.0
Mobilization	Hauling	6.00	25.0
Mobilization	Onsite truck	0.00	—
Site Improvements	—	—	—
Site Improvements	Worker	70.0	25.0
Site Improvements	Vendor	2.00	25.0
Site Improvements	Hauling	6.00	25.0
Site Improvements	Onsite truck	—	—
Panel Installation	—	—	—
Panel Installation	Worker	120	25.0

Panel Installation	Vendor	2.00	25.0
Panel Installation	Hauling	8.00	200
Panel Installation	Onsite truck	—	—

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residen Coated (sq ft

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Dem
Mobilization	—	—	7.50	0.00
Site Improvements	—	—	37.5	0.00

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction
Water Exposed Area	2	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
User Defined Industrial	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4
2024	0.00	204	0.03

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Co
emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	14.9	annual days
Extreme Precipitation	18.8	annual days
Sea Level Rise	0.00	meters of inu
Wildfire	21.8	annual hecta

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily m
historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 mil
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which
day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–
increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation
different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (Can
possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average un
vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire prob
different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (Can
possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score
Temperature and Extreme Heat	N/A	N/A	N/A
Extreme Precipitation	0	0	0
Sea Level Rise	N/A	N/A	N/A
Wildfire	0	0	0
Flooding	0	0	0
Drought	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of
exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on
greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not includ

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score
Temperature and Extreme Heat	N/A	N/A	N/A
Extreme Precipitation	1	1	1
Sea Level Rise	N/A	N/A	N/A
Wildfire	1	1	1
Flooding	1	1	1
Drought	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include imple

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in th

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	3.91
AQ-PM	1.00
AQ-DPM	1.16
Drinking Water	32.1

Lead Risk Housing	39.0
Pesticides	19.3
Toxic Releases	7.95
Traffic	0.61
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	67.2
Haz Waste Facilities/Generators	43.3
Impaired Water Bodies	43.8
Solid Waste	94.7
Sensitive Population	—
Asthma	47.5
Cardio-vascular	73.5
Low Birth Weights	51.3
Socioeconomic Factor Indicators	—
Education	29.3
Housing	9.19
Linguistic	0.00
Poverty	59.2
Unemployment	74.7

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tr

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	43.2567689
Employed	32.144232

Median HI	31.00218144
Education	—
Bachelor's or higher	46.42627999
High school enrollment	100
Preschool enrollment	31.61811882
Transportation	—
Auto Access	68.11240857
Active commuting	7.031951752
Social	—
2-parent households	80.16168356
Voting	64.78891313
Neighborhood	—
Alcohol availability	88.86179905
Park access	8.481971
Retail density	0.397792891
Supermarket access	14.76966508
Tree canopy	98.15218786
Housing	—
Homeownership	71.48723213
Housing habitability	81.86834339
Low-inc homeowner severe housing cost burden	63.91633517
Low-inc renter severe housing cost burden	76.76119595
Uncrowded housing	68.66418581
Health Outcomes	—
Insured adults	61.8760426
Arthritis	0.0
Asthma ER Admissions	21.4

High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	10.7
Cognitively Disabled	6.7
Physically Disabled	19.5
Heart Attack ER Admissions	43.0
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	11.5
SLR Inundation Area	0.0
Children	50.1
Elderly	16.0
English Speaking	98.1
Foreign-born	0.5

Outdoor Workers	12.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	97.2
Traffic Density	5.5
Traffic Access	0.0
Other Indices	—
Hardship	36.4
Other Decision Support	—
2016 Voting	57.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	25.0
Healthy Places Index Score for Project Location (b)	53.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Project size is 12 acres
Construction: Construction Phases	Construction phases, dates, and duration as pe
Construction: Off-Road Equipment	Construction equipment based on communicati Soil import/export would be balanced onsite
Construction: Trips and VMT	Panel installation haul trucks assume a round-tr Bay area ports) All other construction phases and vehicle trip di miles each way) to reach Arcata and Eureka are

North Coast Highway Solar Project REV2b

CalEEMod Daily Construction Emission Summary

	Maximum Daily Emissions (pounds/day)									
2024	**ROG**	**NOx**	**CO**	**SOx**	**PM10Exh**	**PM10Fug**	**PM10Total**	**PM2.5Exh**	**PM2.5 Fug**	**PM2.5Total**
Mobilization										
Onsite	0.9	8.0	10.5	0.0	0.4	0.2	0.6	0.3	0.0	0.4
Offsite	0.2	1.3	3.5	0.0	0.0	0.7	0.7	0.0	0.2	0.2
Total	1.2	9.3	14.0	0.0	0.4	0.9	1.3	0.4	0.2	0.5
Site Improvement and Grading										
Onsite	4.2	38.9	34.0	0.1	1.7	5.7	7.4	1.6	2.7	4.3
Offsite	0.5	1.8	8.1	0.0	0.0	1.4	1.4	0.4	0.0	0.4
Total	4.7	40.7	42.1	0.1	1.7	7.2	8.9	1.9	2.7	4.6
Panel Installation										
Onsite	1.1	9.1	12.2	0.0	0.3	0.0	0.3	0.3	0.0	0.3
Offsite	1.0	8.8	14.2	0.1	0.1	3.6	3.7	0.1	0.9	1.0
Total	2.1	17.9	26.4	0.1	0.4	3.6	4.1	0.4	0.9	1.3
Maximum Total Emissions - 2024	4.7	40.7	42.1	0.1	1.7	7.2	8.9	1.9	2.7	4.6
NCUAQMD Threshold	**50**	**50**	**500**	**80**			**80**			**50**
Exceeds Threshold	**NO**	**NO**	**NO**	**NO**			**NO**			**NO**

Fugitive dust emissions reflects compliance with NCUAQMD Rule 104(D) - Fugitive Dust (2x watering per day)

Emission Summary

2024	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Mobilization	1.2	9.3	14.0	0.0	1.3	0.5
Site Improvement and Grading	4.7	40.7	42.1	1.7	8.9	4.6
Panel Installation	2.1	17.9	26.4	0.1	4.1	1.3
Max Daily Emissions - 2024	**4.7**	**40.7**	**42.1**	**1.7**	**8.9**	**4.6**

North Coast Highway Solar Project REV2b

CalEEMod Annual Construction Emission Summary - Unmitigated

	Annual Daily Emissions (tons/year)									
2024	**ROG**	**NOx**	**CO**	**SOx**	**PM10Exh**	**PM10FUG**	**PM10Total**	**PM2.5Exh**	**PM2.5 FUG**	**PM2.5Total**
Mobilization										
Onsite	0.01	0.06	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.07	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Improvement and Grading										
Onsite	0.03	0.29	0.25	0.00	0.01	0.04	0.05	0.01	0.02	0.03
Offsite	0.00	0.02	0.06	0.00	0.00	0.01	0.01	0.00	0.00	0.00
Total	0.03	0.31	0.31	0.00	0.01	0.05	0.06	0.01	0.02	0.03
Panel Installation										
Onsite	0.02	0.18	0.24	0.00	0.01	0.00	0.01	0.01	0.00	0.01
Offsite	0.02	0.17	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02
Total	0.04	0.35	0.53	0.00	0.01	0.07	0.08	0.01	0.02	0.03
Maximum Total Emissions - 2024	**0.08**	**0.73**	**0.95**	**0.00**	**0.02**	**0.12**	**0.14**	**0.02**	**0.04**	**0.06**

NCUAQMD Threshold	**40**	**40**	**100**			**15**	**10**
Exceeds Threshold	**NO**	**NO**	**NO**	**NO**		**NO**	**NO**

Fugitive dust emissions reflects compliance with NCUAQMD Rule 104(D) - Fugitive Dust (2x watering per day)

Emisison Summary

2024	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Mobilization	0.0	0.1	0.1	0.0	0.0	0.0
Site Improvement and Grading	0.0	0.3	0.3	0.0	0.1	0.0
Panel Installation	0.0	0.4	0.5	0.0	0.1	0.0
Max Daily Emissions - 2024	**0.1**	**0.7**	**1.0**	**0.0**	**0.1**	**0.1**

North Coast Highway Solar Project

Construction Equipment Fuel Usage

Activity	Equipment	Project Number	Project Hours per day	Default Horse-power	Default Load Factor	Days of Construction	Total Horsepow hours
Mobilization	Off-Highway Trucks	1	4	376	0.38	15	8,5
	Graders	1	8	148	0.41	15	7,2
	Rubber Tired Loader	1	8	150	0.36	15	6,4
	Rough Terrain Forklift	1	8	96	0.4	15	4,6
Site Improvements	Excavator	2	8	36	0.38	15	3,2
	Rubber Tired Dozer	2	8	367	0.4	15	35,2
	Off-Highway Truck	1	6	376	0.38	15	12,8
	Graders	1	8	148	0.41	15	7,2
	Scraper	1	8	423	0.48	15	24,3
	Paver	1	8	81	0.42	15	4,0
	Rollers	1	8	36	0.38	15	1
Panel Installation and Connection	Bore/Drill Rigs	2	8	46	0.45	40	13,2
	Rough Terrain Forklift	1	8	96	0.4	40	12,2
	Tractors/Loaders/Backhoes	2	8	84	0.37	40	19,8
	Welders	1	4	46	0.45	40	3,3
	Air Compressor	1	8	37	0.48	40	5,6
	Generator Set	1	8	14	0.74	40	3,3

OFFROAD 2021, California Statewide for 2024

North Coast Highway Solar Project
Data Attachment

North Coast Highway Solar Project

Fuel Consumption from Construction Vehicles (Derived from the ARB EMFAC2021 Mobile Source Emission Model)

Emission Factors

Region (Air Basin)	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT (miles/day)	Fuel Consumption (1000 gallons/day)	Fuel Rate (miles/gallon)	
North Coast	2024	HHDT-T7	Aggregated	Aggregated	DSL	555467	94.0	5.9	Haul Trucks
North Coast	2024	MHDT-T5	Aggregated	Aggregated	DSL	122698	14.4	8.5	
								7.2	Vendor Trucks
North Coast	2024	LHDT1	Aggregated	Aggregated	DSL	448343	28	16.0	
North Coast	2024	LDA	Aggregated	Aggregated	GAS	5373868	185	29.0	
North Coast	2024	LDT1	Aggregated	Aggregated	GAS	754714	32	23.6	
North Coast	2024	LDT2	Aggregated	Aggregated	GAS	3151149	136	23.2	
								26.2	Passenger Cars

Vehicle Assumptions (CalEEMod)
Haul trucks represented by HHDT-T7 (heavy -heavy duty haul truck)
Vendor trucks represented by 50% HHDT-T7 and 50% MHDT
Worker vehicles represente by 50% LDA, 25% LDT1 and 25% LDT2

Construction Vehicle Use **(Derived from the CalEEMod model output)**

Fuel Consumption for Haul Trucks

Construction Activity	No Haul Truck Trips/day	Duration (days)	Total Number of Trips	Trip Length	VMT (miles)	DSL Fuel (gallons)
Mobilization	6	15	90	25	2250	381
Site Improvement	6	15	90	25	2250	381
Panel Installation and Connection	8	40	320	200	64000	10831
Total	**20**				**68500**	**11592**

Construction Activity	No Vendor Truck Trips/day	Duration (days)	Trip Length (miles)	VMT (miles)	Fuel	Fuel Rate (miles/gallon)	DSL Fuel (gallons)
Mobilization	2	15	25	750	DSL	7.2	104
Site Improvement	2	15	25	750	DSL	7.2	104
Panel Installation and Connection	2	40	25	2000	DSL	7.2	277
						Total	**485**

Activity	No Worker Vehicles Trips/day	Duration (days)	Trip Length (miles)	VMT (miles)	Fuel	Fuel Rate (miles/gallon)	GAS Fuel (gallons)
Mobilization	30	15	25	11250	GAS	26	429
Site Improvement	70	15	25	26250	GAS	26	1001
Panel Installation and Connection	120	40	25	120000	GAS	26	4578
						Total	**6009**

Summary	Gallons
Total -DSL	12077
Total - GAS	6009
Total - Fuel	18086

North Coast Highway Solar Project

Total Daily Onsite and Offsite Operational Emissions

	Daily Emissions (pounds/day)						
Onsite Emissions	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Exhaust	0.008	0.067	0.025	0.000	0.003	0.002	17.551
Road Dust - Unpaved	0.000	0.000	0.000	0.000	1.171	0.117	0.000
Road Dust - Paved	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.008	0.067	0.025	0.000	1.174	0.119	17.551

	Daily Emissions (pounds/day)						
Offsite Emissions	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Exhaust	0.247	3.071	0.767	0.007	0.151	0.087	733.589
Road Dust - Paved	0.000	0.000	0.000	0.000	0.035	0.009	0.000
Total	0.247	3.071	0.767	0.007	0.186	0.096	733.589

	Total Daily Emissions (pounds/day)						
	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Onsite	0.008	0.067	0.025	0.000	1.174	0.119	17.551
Offsite	0.247	3.071	0.767	0.007	0.186	0.096	733.589
Total	0.255	3.138	0.792	0.007	1.360	0.215	751.140

North Coast Highway Solar Project

Total Annual Onsite and Offsite Operational Emissions

	Annual Emissions (tons/year)							
Onsite Emissions	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CO2e**
Exhaust	7.937E-03	6.656E-02	2.515E-02	1.705E-04	2.851E-03	2.093E-03	1.755E+01	1.597E+01
Road Dust - Unpaved	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.405E-02	1.405E-03	0.000E+00	0.000E+00
Road Dust - Paved	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.164E-06	7.767E-07	0.000E+00	0.000E+00
Total	7.937E-03	6.656E-02	2.515E-02	1.705E-04	1.690E-02	3.499E-03	1.755E+01	1.615E+01

	Annual Emissions (tons/year)							
Offsite Emissions	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CO2e**
Exhaust	2.467E-01	7.891E-03	2.047E-03	1.585E-05	3.793E-04	2.228E-04	1.672E+00	1.522E+00
Road Dust - Paved	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.637E-04	6.472E-05	0.000E+00	0.000E+00
Total	2.467E-01	7.891E-03	2.047E-03	1.585E-05	6.429E-04	2.875E-04	1.672E+00	1.539E+00

	Total Annual Emissions (tons/year)							
	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CO2e**
Onsite	7.937E-03	6.656E-02	2.515E-02	1.705E-04	1.690E-02	3.499E-03	1.755E+01	1.597E+01
Offsite	2.467E-01	7.891E-03	2.047E-03	1.585E-05	6.429E-04	2.875E-04	1.672E+00	1.539E+00
Total	2.546E-01	7.445E-02	2.720E-02	1.863E-04	1.755E-02	3.786E-03	1.922E+01	1.769E+01

North Coast Highway Solar Project

Operational Offsite Mobile Source VMT and Exhaust Emissions

Operational Activity
Routine Maintenance

Frequency:	Annually			
Times/year	1			
Trips/day	6	(Assumes	3	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Distance/Trip	25	miles		
VMT	150	miles/day		
	150	miles/year		

Reactive Maintenance

Frequency	Monthly			
Times/year	12			
Trips/year	72	(assumes	3	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/day	6			
Distance/Trip	25	miles		
VMT	150	miless/day		
VMT	1800	miles/year		

Washing of Solar Panels

Frequenty:	Semi-Annual			
Times/year	2			
Trips/year - LHDT1	8	(Assumes	2	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/year - HHDT	4	(Assumes	1	water truck - HHDT DSL per site visit)
Trips/day - LHDT1	4	(Assumes	2	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/day - HHDT	2	(Assumes	1	water truck - HHDT DSL per site visit)
Distance/trip-LDT1	25	miles		
Distance/Trip-HHDT	25	miles		
VMT - LHDT1	100	miles/day		
	200	miles/year		
VMT - HHDT	50	miles/day		
	100	miles/year		

Total VMT

	Daily	Annual
Routine	150	150
Reactive	150	1800
Panel Washing - LHDT1	100	200
Panel Washing - HHDT	50	100
Total	**450**	**2250**

EMFAC2021 Mobile Source Emissions — **North Coast Air Basin - 2024**

EMFAC2021 Emission Factors - grams/mile Aggregated for All Speeds

LHDT1	ROG	NOx	CO	SOx	PM10 *	PM2.5 *	CO2
Aggregate-DSL	0.278	3.242	0.860	0.006	0.154	0.091	631.4106

EMFAC2021 Emission Factors - grams/mile Aggregated for All Speeds

HHDT	ROG	NOx	CO	SOx	PM10 *	PM2.5 *	CO2
Aggregate-DSL	0.019	1.952	0.084	0.015	0.142	0.064	1609.706

Operational Offsite Emissions

Criteria Emissions (pounds/day)

Routine Maintenance	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Daily	0.092	1.071	0.284	0.002	0.051	0.030	208.616

Criteria Emissions (tons/year)

Annual	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
	4.587E-05	5.355E-04	1.421E-04	9.884E-07	2.537E-05	1.505E-05	1.043E-01

Criteria Emissions (pounds/day)

Reactive Maintenance	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Daily	0.0917	1.0710	0.2843	0.0020	0.0507	0.0301	208.6158

Criteria Emissions (tons/year)

Annual	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
	5.504E-04	6.426E-03	1.706E-03	1.186E-05	3.045E-04	1.807E-04	1.252E+00

Panel Washing

Criteria Emissions (pounds/day)

	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Daily - LHDT1	0.0611578	0.7140055	0.1895134	0.00131783	0.033828	0.020072	139.07723

Criteria Emissions (tons/year)

	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Annual - LHDT1	6.116E-05	7.140E-04	1.895E-04	1.318E-06	3.383E-05	2.007E-05	1.391E-01

Criteria Emissions (pounds/day)

	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Daily - HHDT	0.0020551	0.2149685	0.0092789	0.00167874	0.015602	0.007038	177.2804

Criteria Emissions (tons/year)

	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
Annual - HHDT	2.055E-06	0.000215	9.279E-06	1.6787E-06	1.56E-05	7.04E-06	0.1772804

Total Offsite Emissions

Criteria Emissions (pounds/day)

Daily **	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
	0.2467	3.0710	0.7673	0.0070	0.1509	0.0873	733.5893

Criteria Emissions (tons/year)

Annual	ROG	NOx	CO	SOx	PM10	PM2.5	CO2
	0.0006595	0.0078905	0.0020465	1.5845E-05	0.000379	0.000223	1.6723606

(*) Includes running exhaust emissions, tirewear, and brakewear emissions
(**) Assumes as a daily worst case that the reactive maintenance occurs on the same day as the panel watering

North Coast Highway Solar Project

Operational Onsite Mobile Source VMT and Exhaust Emissions

Operational Activity
Routine Maintenance

Frequency:	Annually			
Times/year	1			
Trips/day	6	(Assumes	3	worker vehiles - LDHT1 DSL Service Vehicle per site visit)
Distance/Trip	0.3	miles		
VMT	1.8	miles/day		
	1.8	miles/year		

Reactive Maintenance

Frequency	Monthly			
Times/year	12			
Trips/year	72	(assumes	3	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/day	6			
Distance/Trip	0.3	miles		
VMT	1.8	miless/day		
VMT	21.6	miles/year		

Washing of Solar Panels

Frequenty:	Semi-Annual			
Times/year	2			
Trips/year - LHDT1	8	(Assumes	2	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/year - HHDT	4	(Assumes	1	water truck - HHDT DSL per site visit)
Trips/day - LHDT1	4	(Assumes	2	worker vehicles - LDHT1 DSL Service Vehicle per site visit)
Trips/day - HHDT	2	(Assumes	1	water truck - HHDT DSL per site visit)
Distance/trip-LDT1	0.3	miles		
Distance/Trip-HHDT	0.3	miles		
VMT - LHDT1	1.2	miles/day		
	2.4	miles/year		
VMT - HHDT	0.6	miles/day		
	1.2	miles/year		

Total VMT

	Daily	Annual
Routine	1.8	1.8
Reactive	1.8	21.6
Panel Washing - LHDT1	1.2	2.4
Panel Washing - HHDT	0.6	1.2
Total	**5.4**	**27**

EMFAC2021 Mobile Source Emissions — **North Coast Air Basin - 2024**

EMFAC2021 Emission Factors - grams/mile @ 5mph

LHDT1	**ROG**	**NOx**	**CO**	**SOx**	**PM10 ***	**PM2.5 ***	**CO2**
DSL	0.669	3.688	2.199	0.012	0.231	0.173	1223

EMFAC2021 Emission Factors - grams/mile @ 5 mph

HHDT	**ROG**	**NOx**	**CO**	**SOx**	**PM10 ***	**PM2.5 ***	**CO2**
DSL	0.654	20.860	1.437	0.033	0.309	0.200	3496

Operational Offsite Emissions

Criteria Emissions (pounds/day)

Routine Maintenance		**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
	Daily	0.003	0.015	0.009	0.000	0.001	0.001	4.849

Criteria Emissions (tons/year)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Annual	1.326E-06	7.311E-06	4.359E-06	2.379E-08	4.579E-07	3.430E-07	2.424E-03

Criteria Emissions (pounds/day)

Reactive Maintenance		**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
	Daily	0.0027	0.0146	0.0087	0.0000	0.0009	0.0007	4.8489

Criteria Emissions (tons/year)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Annual	1.591E-05	8.773E-05	5.231E-05	2.855E-07	5.495E-06	4.115E-06	2.909E-02

Criteria Emissions (pounds/day)

Panel Washing		**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
	Daily - LHDT1	0.001768282	0.0097477	0.0058123	3.1718E-05	0.000611	0.000457	3.2325991

Criteria Emissions (tons/year)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Annual - LHDT1	1.768E-06	9.748E-06	5.812E-06	3.172E-08	6.106E-07	4.573E-07	3.233E-03

Criteria Emissions (pounds/day)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Daily - HHDT	0.000864317	0.0275683	0.0018991	4.3612E-05	0.000408	0.000264	4.6202643

Criteria Emissions (tons/year)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Annual - HHDT	8.64317E-07	2.757E-05	1.899E-06	4.3612E-08	4.08E-07	2.64E-07	0.0046203

Total Offsite Emissions

Criteria Emissions (pounds/day)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Daily **	0.00794	0.06656	0.02515	0.00017	0.00285	0.00209	17.55066

Criteria Emissions (tons/year)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**CO2**
Annual	1.987E-05	1.324E-04	6.438E-05	3.846E-07	6.972E-06	5.180E-06	3.937E-02

(*) Includes running exhaust emissions, tirewear, and brakewear emissions
(**) Assumes as a daily worst case that the reactive maintenance occurs on the same day as the panel watering

North Coast Highway Solar Project

Operational Paved Road Dust (AP-42, Chapter 13.2.1.3)

Offsite Paved Road Dust

E = k x (sL)^.91 x (W)^1.02

E = emissio factor (lbs/VMT)
k = particle size multiplier (PM10: 0.0022 lb/VMT ; PM2.5: 0.00054 lb/VMT)
sL = road surface silt loading (0.032 g/m2): ARB Miscellaneous Process Methodoloy Paved Road Dust_
W = average weight of vehicles traveling on the road (2.4 tons)

Maximum Daily Offsite Travel:	150	miles/day
PM10 Paved Road Dust Emisison Factor (lbs/VMT) =	0.000234382	
PM2.5 Paved Road Dust Emission Factor (lb/VMT) =	5.75302E-05	
Maximum Daily PM10 Road Dust:	0.035157	lbs/day
Maximum Daily PM2.5 Road Dust:	0.00863	lbs/day
Annual Offsite Offsite Travel:	2250	miles/year
Annual PM10 Road Dust:	0.52736 lbs/year or	0.00026368 tons/year
Annual PM2.5 Road Dust:	0.129443 lbs/year or	6.47214E-05 tons/year

Onsite Paved Road Dust

E = k x (sL)^.91 x (W)^1.02

E = emissio factor (lbs/VMT)
k = particle size multiplier (PM10: 0.0022 lb/VMT ; PM2.5: 0.00054 lb/VMT)
sL = road surface silt loading (0.032 g/m2): ARB Miscellaneous Process Methodoloy Paved Road Dust_
W = average weight of vehicles traveling on the road (2.4 tons)

Maximum Daily Onsite Travel:	1.8	miles/day
PM10 Paved Road Dust Emisison Factor (lbs/VMT) =	0.000234382	
PM2.5 Paved Road Dust Emission Factor (lb/VMT) =	5.75302E-05	
Maximum Daily PM10 Road Dust:	0.000422	lbs/day
Maximum Daily PM2.5 Road Dust:	0.000104	lbs/day
Annual Offsite Onsite Travel:	27	miles/year
Annual PM10 Road Dust:	0.006328 lbs/year or	3.16416E-06 tons/year
Annual PM2.5 Road Dust:	0.001553 lbs/year or	7.76657E-07 tons/year

North Coast Highway Solar Project

Operational Onsite Unaved Road Dust (CalEEMod2022.1)

EF = (k *s/12 * (S/30)^.5)/(M/.5)^.2

E = emission factor (lbs/VMT)
k = particle size multiplier (PM10: 1.8 lb/VMT ; PM2.5: 0.18 lb/VMT)
s = road surface silt content in % (8.5)
S = mean vehicle speed (20 mph)
M = surface material moisture content (0.5%)

Maximum Daily Onsite Travel:	1.8	miles/day
PM10 Unpaved Road Dust Emisison Factor (lbs/VMT) =	1.041033141	
PM2.5 Unpaved Road Dust Emission Factor (lb/VMT) =	0.104103314	
Maximum Daily PM10 Road Dust:	1.87386	lbs/day
Maximum Daily PM2.5 Road Dust:	0.187386	lbs/day
Annual Onsite Onsite Travel:	27	miles/year
Annual PM10 Road Dust:	28.10789	lbs/year or 0.014053947 tons/year
Annual PM2.5 Road Dust:	2.810789	lbs/year or 0.001405395 tons/year

North Coast Highway Solar Project

Estimation of Operational Vehicle Fuel Use

Vehicle Class	Annual VMT	EMFAC2021 Fuel Rate -DSL (mi/gallons)	Fuel Consumption DSL-(gal/year)
LHDT1 - DSL	2,176	16.0	136
HHDT - DSL	101	5.9	17
Total	**2,277**		153

Solar Emission Offsets from Natural Gas Consumption Energy Production

Total Annual Generation	2906	MWh/year	Note 1
PG&E CO2 Emission Factor for Fossil Fuels Displacement	870	lbs/MWh	Note 2
Total CO2 from Fossil Fuels Generation Replacement	2528220	lbs/year	
	1264.11	tons/year	
	1150.34	MTCO2e/year	
Total CO2 from Construction and Operation	16	**MTCO2e/year**	
Net CO2 from the Project	-1134.34	**MTCO2e/year**	
Net CO2e Replacement over 20-year Project Life	**-22686.8**	**MTCO2e**	

Notes

1) Provided by the Project Applicant
2) PG&E Average of GHG emission factors for the Gateway Generating Station and Colusa Generating Station in 2020 on Natural Gas