Darden Clean Energy Project (23-OPT-02)

CEC Data Request Response Set #3

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April 2024

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1 Introduction

On December 11, 2023, IP Darden I, LLC and Affiliates (Applicant) received a Determination of Incomplete Application and Request for Information from the California Energy Commission (CEC) for the Darden Clean Energy Project (23-OPT-02) in response to the Applicant's application filed on November 9, 2023. The following document provides the Applicant's third set of responses to the Data Requests received from the CEC. Table 1 lists all Data Requests for which a response is provided in Response Set #3.

Table 1 Data Responses Included in Response Set #3

Data Request Resources Area	Data Request Number
Air Quality	AQ-1 through AQ-12
Biological Resources	--
Cultural and Tribal Cultural Resources	--
Efficiency, Energy and Energy Resources	EEF-1 through EEF-3
Geologic Hazards	--
Greenhouse Gas Emission (Climate Change)	GHG-1 through GHG-9
Hazardous Materials Handling	HAZ-1
Land Use	--
Noise	--
Project Description	--
Public Health	PH-1 through PH-5
Socioeconomics	SOCIO-1 (Resubmitted)
Soils	--
Traffic and Transportation	--
Transmission System Design	--
Visual Resources	--
Waste Management	--
Water Resources	--
Worker Safety	--

The responses are grouped by individual discipline or topic area and are presented in the same order and with the same numbering provided by the CEC. New or revised graphics, tables, or attachments are provided throughout and as appendices to this document. The responses included in this document are considered complete responses to the corresponding Data Requests.

Table 2 provides a list of all remaining Data Requests received from the CEC that have not been addressed in Response Set #1, Response Set #2, or Response Set #3.

Table 2 Outstanding Data Responses

Data Request Resources Area	Data Request Number
Air Quality	--
Biological Resources	BIO-1 through BIO-47
Cultural and Tribal Cultural Resources	--
Efficiency, Energy and Energy Resources	--
Geologic Hazards	--
Greenhouse Gas Emission (Climate Change)	--
Hazardous Materials Handling	
Land Use	--
Noise	--
Project Description	--
Public Health	--
Socioeconomics	--
Soils	--
Traffic and Transportation	--
Transmission System Design	TSD-3 and TSD-6
Visual Resources	--
Waste Management	--
Water Resources	WATER-1 through WATER-23
Worker Safety	--

Supplemental Data Request Response Sets will be provided to the CEC in response to the Data Requests not addressed in this document.

2 Air Quality

2.1 Data Requests DR AQ-1 through DR AQ-12

2.1.1 Data Request DR AQ-1

DR AQ-1: Please provide copies of all substantive correspondence between the applicant and the District regarding the project, including applications and emails, within one week of submittal or receipt. This request remains in effect until staff publishes the environmental document.

Response: The Applicant initiated coordination with the San Joaquin Valley Air Pollution Control District (SJVAPCD) on January 19, 2024 to begin discussion on how to obtain a concurrence determination from SJVAPCD for the Project's point source equipment. The Applicant has provided meeting minutes to the CEC for all meetings held between the Applicant, CEC, and SJVAPCD. No other substantive correspondence between the Applicant and SJVAPCD has occurred at this time. The Applicant will continue to provide the CEC copies of all substantive correspondence between them and SJVAPCD until CEC publishes the environmental document.

2.1.2 Data Request DR AQ-2

DR AQ-2: Please provide a completeness determination letter from the SJVAPCD confirming that the application submitted to the District has been deemed complete.

Response: Pursuant to Public Resources Code section 25545.1(b), "issuance of a certificate by the commission for a site and related facility pursuant to this chapter shall be in lieu of any permit, certificate, or similar document required by any state, local, or regional agency, or federal agency," except for the State Lands Commission, the California Coastal Commission, the San Francisco Bay Conservation and Development Commission, the State Water Resources Control Board, or the applicable regional water quality control boards. The SJVAPCD is not one of the enumerated agencies, the permits required here are not Title V permits and, therefore, any local air quality permit would be subsumed in the CEC's certification.

Appendix A of this document includes a preliminary draft air permit application package that includes a complete application for air permits which would have otherwise been submitted to the SJVAPCD outside of the Opt-In Application process. The Applicant submitted the preliminary draft air permit application package (Appendix A to this document) to SJVAPCD on April 5, 2024 and understands that SJVAPCD will review and, if appropriate, provide a concurrence determination to CEC stating that sufficient information has been provided to prepare an engineering evaluation in support of application completeness review during the CEQA process so that necessary conditions of approval can be included in CEC's certification.

2.1.3 Data Request DR AQ-3

DR AQ-3: Please provide up-to-date manufacturer specification sheets showing backup generator engine and emissions control system performance specifications. Please include the stack heights and diameters, the exhaust velocities, and temperatures. This information should identify potential emissions for a foreseeable range of engine load settings, and documentation substantiating the effectiveness of proposed selective catalytic reduction (SCR) and diesel particulate filter (DPF) systems.

Response: Identification of the specific back-up generators for the Project facilities will be made at a later stage of engineering and design. Representative manufacturer specifications are provided for the LPG-fired backup emergency generator associated with the Project substation (Option 1, Option 2, and Alternate Green Hydrogen Substation), and the diesel-fired fire pump engine and the diesel-fired backup emergency generator associated with the Project's hydrogen facility (Option 1, Option 2, and Alternate Hydrogen Facility). The manufacturer specifications have stack parameters; however, for the air dispersion modeling, SJVAPCD default parameters were applied. These manufacturer specifications and the parameters provided by the SJVAPCD have been provided in Appendix E of Appendix A for reference.

2.1.4 Data Request DR AQ-4

DR AQ-4: BACT for backup generator engines in the SJVAPCD is Tier IV and would require the use of an SCR. Please provide the project's estimated ammonia emissions in tons per year.

Response: The LPG-fired backup emergency generator associated with the Project substations (Option 1, Option 2, and Alternate Green Hydrogen Substation) and the diesel-fired backup emergency generator associated with the Project's hydrogen facility (Option 1, Option 2, and Alternate Hydrogen Facility) are expected to be equipped with selective catalytic reduction (SCR) systems. The diesel-fired fire pump engine associated with the Project's hydrogen facility (Option 1, Option 2, and Alternate Hydrogen Facility) may not be required to equip an SCR; however, to allow for a conservative estimate of ammonia emission the Applicant assumed the fire pump engine will require an SCR. Based on the 100 hours per year equipment usage assumption, the Project is estimated to produce 0.32 tons per year of ammonia. More information related to ammonia emissions is provided in Appendix B. Aqueous ammonia that would be used for the emergency generators was included in the updated Table 5.9-1 in response to DR HAZ-3, which was provided with Response Set 2.

2.1.5 Data Request DR AQ-5

DR AQ-5: Please provide emission calculations to disclose the potential to emit (PTE) for the project, considering the District policy to include emissions resulting from emergency operation of 100 hours per year per backup generator, in addition to the proposed levels of permitted emissions for readiness testing and maintenance. Please include emission rates of criteria pollutants and greenhouse gases (CO_2, CH_4, N_2O, and SF_6) from the backup generator stacks.

Response: Emissions factors and calculations are provided in Appendix B. Criteria pollutant emission factors were based on either manufacturer specifications or United States Environmental Protection Agency (US EPA) Tier standards. The LPG-fired emergency generators emission factors were based on the manufacturer specifications. The diesel-fired emergency generator emission factors were based on US EPA Tier 4 standards and the diesel-fired fire pump engine emission factors were based on US EPA Tier 3 standards. Greenhouse gas emission factors are provided from CalEEMod/OFFROAD model supporting reference materials.

2.1.6 Data Request DR AQ-6

DR AQ-6: Please describe how the load levels of the backup generators would be tested for reliability testing and maintenance.

Response: The emergency backup generators and fire pump engines will be tested monthly to meet facility reliability standards and applicable code requirements. Testing will occur by either supplying power to the facility through a meter or against a load bank. Testing of the emergency generators and fire pump engines at the hydrogen facility would be staggered with only one unit being tested at any given time. A formal testing plan defining loads, durations, startup, etc. will be developed in conjunction with the manufacturer of the generators to ensure the testing adequately confirms the availability of the generators when needed.

2.1.7 Data Request DR AQ-7

DR AQ-7: Please describe situations when the backup generators would be dispatched in an emergency or for other reasons.

Response: The diesel generators at the hydrogen facility are not intended for normal operation; they are included in the design to address major power supply failures and to ensure the safe and reliable shutdown of the facility. The current facility design has identified two applications for the use of emergency diesel generators:

1. Standby fire water pump drive.
2. Backup power to the overall facility during a complete power supply failure (no renewable power and no grid back up).

The LPG generators for the Project substation would be used for backup power to the substation control building during power supply failures for climate control and charging batteries for protective systems.

2.1.8 Data Request DR AQ-8

DR AQ-8: Please provide examples of how VERA funds could be administered for this type of project.

Response: According to the San Joaquin Valley Air Pollution Control District's (SJVAPCD) *Emission Reduction Clean Air Measures,* "A Voluntary Emissions Reduction Agreement (VERA) is a clean air measure by which the project proponent provides pound-for-pound mitigation of emissions increases through a process that develops, funds, and implements emission reduction projects. To implement a VERA, the project proponent and the District enter into a contractual agreement in which the project proponent agrees to mitigate project specific emissions by providing funds for the District's incentives programs. Types of emission reduction projects that have been funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old Heavy Heavy-Duty (HHD) trucks with new, cleaner, more efficient HHD trucks, and replacement of old farm tractors."[1]

[1] San Joaquin Valley Air Pollution Control District. 2022. Emission Reduction Clean Air Measures. Available at https://ww2.valleyair.org/media/ob0pweru/clean-air-measures.pdf; Page 7.

2.1.9 Data Request DR AQ-9

DR AQ-9: Please describe how an equivalency for VERA funds would be calculated over the years, and would the SJVAPCD distribute these funds?

Response: As discussed in DR AQ-8, the Applicant would enter into a contractual agreement with the SJVAPCD to mitigate Project specific emissions by providing funds for the SJVAPCD's incentives programs. The VERA would identify the amount of emissions to be reduced (pound-for-pound), in addition to the amount of funds to be paid by the Applicant to the SJVAPCD to implement emission reduction projects required for the Project on an annual basis and in advance of construction in that calendar year. SJVAPCD would distribute the VERA funds.

2.1.10 Data Request DR AQ-10

DR AQ-10: What entity would be reviewing and approving these VERA funds for this project?

Response: As discussed in DR AQ-8, SJVAPCD would review and approve the VERA funds for this Project.

2.1.11 Data Request DR AQ-11

DR AQ-11: Please provide the additional results of the AAQA for nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) during the construction and operation periods respectively.

Response: The construction ambient air quality analysis (AAQA) results for NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ are provided in Table 3 through Table 6 below for both the 18-month and 36-month proposed construction schedules. The AAQA results for NO_2, CO and SO_2 are presented against the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). The PM_{10} and $PM_{2.5}$ AAQA results are presented against the significant impact levels (SILs) pursuant to San Joaquin Valley Air Pollution Control District (SJVAPCD) APR 1925, *Policy for District Rule 2201 AAQA Modeling*.

As demonstrated in Table 3 through Table 6, all impacts from Project construction are below applicable thresholds. More technical information related to the AAQA is provided in Appendices C through E.

Table 3 18-Month Construction Schedule AAQA Results Summary, NO_2, CO and SO_2

Pollutant	Averaging Period	Background (ug/m^3)	Project (ug/m^3)	Project + Background (ug/m^3)	AAQS (ug/m^3)	Exceedance
NO_2	1Hr - NAAQS	123.4	61	185	188	No
	1Hr - CAAQS	123.4	100	224	339	No
	Annual - NAAQS	34.8	1.4	36	100	No
	Annual - CAAQS	34.8	1.4	36	57	No
CO	1Hr - NAAQS	3,986.7	3,787	7,774	40,000	No
	1Hr - CAAQS	3,986.7	3,787	7,774	23,000	No
	8Hr - NAAQS	2,864.0	848	3,712	10,000	No
	8Hr - CAAQS	2,864.0	848	3,712	10,000	No

Pollutant	Averaging Period	Background (ug/m³)	Project (ug/m³)	Project + Background (ug/m³)	AAQS (ug/m³)	Exceedance
SO_2	1Hr - NAAQS	42.4	5.6	48	196	No
	1Hr - CAAQS	42.4	5.6	48	655	No

Notes:

NO_2 = nitrogen dioxide, CO = carbon monoxide, SO_2 = sulfur dioxide, NAAQS = National Ambient Air Quality Standard, CAAQS = California Ambient Air Quality Standard, ug/m³ = micrograms per meter cubed

Table 4 18-Month Construction Schedule AAQA Results Summary, PM_{10} and $PM_{2.5}$

Pollutant	Averaging Period	Project (ug/m³)	SIL (ug/m³)	Exceedance
PM_{10}	24Hr Exhaust	0.8	5.0	No
	24Hr Fugitive	8.2	10.4	No
	Annual Exhaust	0.03	1.0	No
	Annual Fugitive	0.04	2.08	No
$PM_{2.5}$	24Hr Exhaust	0.82	1.2	No
	24Hr Fugitive	2.0	2.5	No
	Annual Exhaust	0.03	0.2	No
	Annual Fugitive	0.08	0.63	No

Notes:

PM_{10} = particulate matter 10 micrometers or less in diameter, $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter, SIL = significant impact level, ug/m³ = micrograms per meter cubed

Table 5 36-Month Construction Schedule AAQA Results Summary, NO_2, CO and SO_2

Pollutant	Averaging Period	Background (ug/m³)	Project (ug/m³)	Project + Background (ug/m³)	AAQS (ug/m³)	Exceedance
NO_2	1Hr - NAAQS	123.4	43	167	188	No
	1Hr - CAAQS	123.4	80	203	339	No
	Annual - NAAQS	34.8	1.0	36	100	No
	Annual - CAAQS	34.8	1.0	36	57	No
CO	1Hr - NAAQS	3,986.7	2,793	6,779	40,000	No
	1Hr - CAAQS	3,986.7	2,793	6,779	23,000	No
	8Hr - NAAQS	2,864.0	608	3,472	10,000	No
	8Hr - CAAQS	2,864.0	608	3,472	10,000	No
SO_2	1Hr - NAAQS	42.4	4.3	47	196	No
	1Hr - CAAQS	42.4	4.3	47	655	No

Notes:

NO_2 = nitrogen dioxide, CO = carbon monoxide, SO_2 = sulfur dioxide, NAAQS = National Ambient Air Quality Standard, CAAQS = California Ambient Air Quality Standard, ug/m³ = micrograms per meter cubed

Table 6 36-Month Construction Schedule AAQA Results Summary, PM_{10} and $PM_{2.5}$

Pollutant	Averaging Period	Project (ug/m3)	SIL (ug/m3)	Exceedance
PM_{10}	24Hr Exhaust	0.6	5.0	No
	24Hr Fugitive	6.7	10.4	No
	Annual Exhaust	0.02	1.0	No
	Annual Fugitive	0.03	2.08	No
$PM_{2.5}$	24Hr Exhaust	0.62	1.2	No
	24Hr Fugitive	1.6	2.5	No
	Annual Exhaust	0.02	0.2	No
	Annual Fugitive	0.05	0.63	No

Notes:

PM_{10} = particulate matter 10 micrometers or less in diameter, $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter, SIL = significant impact level, ug/m^3 = micrograms per meter cubed

The operations AAQA results for NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ are provided in Table 7 and Table 8, below. The AAQA results for NO_2, CO and SO_2 are presented against the NAAQS and the CAAQS. The PM_{10} and $PM_{2.5}$ AAQA results are presented against the SILs pursuant to SJVAPCD APR 1925, *Policy for District Rule 2201 AAQA Modeling*.

As demonstrated in Table 7 and Table 8, all impacts from Project operations are below applicable thresholds. More technical information related to the AAQA is provided in Appendices C through E. Generators would not be tested simultaneously, only one generator would be tested at a time. As there are six generators per option, the greatest maximum concentration for one of the generators is reported for one-hour standards. Additionally, the highest concentration for each pollutant and averaging period is reported.

Table 7 Operational AAQA Results Summary, NO_2, CO and SO_2

Pollutant	Averaging Period	Background (ug/m^3)	Project (ug/m^3)	Project + Background (ug/m^3)	AAQS (ug/m^3)	Exceedance
NO_2	1Hr - NAAQS	123.4	39.0	162.4	188	No
	1Hr - CAAQS	123.4	56.5	179.9	339	No
	Annual - NAAQS	34.8	13.2	48.1	100	No
	Annual - CAAQS	34.8	13.2	48.1	57	No
CO	1Hr - NAAQS	3,986.7	57.8	4,045	40,000	No
	1Hr - CAAQS	3,986.7	57.8	4,045	23,000	No
	8Hr - NAAQS	2,864.0	17.1	2,881	10,000	No
	8Hr - CAAQS	2,864.0	17.1	2,881	10,000	No
SO_2	1Hr - NAAQS	42.4	3.4	45.9	196	No
	1Hr - CAAQS	42.4	3.4	45.9	655	No

Notes:

NO_2 = nitrogen dioxide, CO = carbon monoxide, SO_2 = sulfur dioxide, NAAQS = National Ambient Air Quality Standard, CAAQS = California Ambient Air Quality Standard, ug/m^3 = micrograms per meter cubed

Table 8 Operational AAQA Results Summary, PM_{10} and $PM_{2.5}$

Pollutant	Averaging Period	Project (ug/m³)	SIL (ug/m³)	Exceedance
PM_{10}	24Hr Exhaust	2.8e-1	5.0	No
	24Hr Fugitive	1.1e-1	10.4	No
	Annual Exhaust	1.5e-2	1.0	No
	Annual Fugitive	1.6e-7	2.08	No
$PM_{2.5}$	24Hr Exhaust	2.7e-1	1.2	No
	24Hr Fugitive	2.5e-2	2.5	No
	Annual Exhaust	1.5e-2	0.2	No
	Annual Fugitive	7.0e-8	0.63	No

Notes:

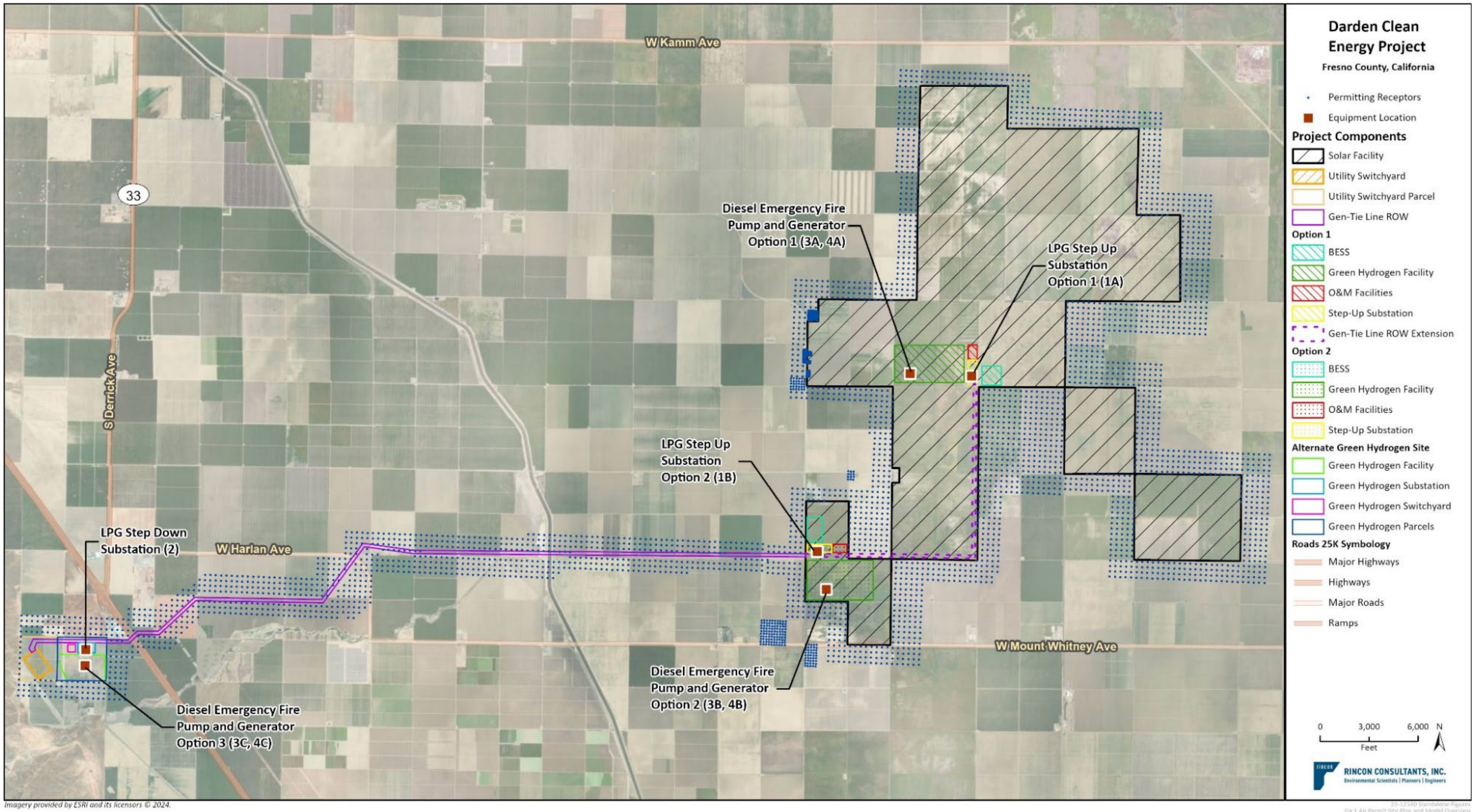
PM_{10} = particulate matter 10 micrometers or less in diameter, $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter, SIL = significant impact level, ug/m³ = micrograms per meter cubed

2.1.12 Data Request DR AQ-12

DR AQ-12: Please provide the proposed locations of all backup generators and provide the modeling results for readiness testing and maintenance at each location by treating them as point sources instead of multiplying their emissions by the area source results.

Response: Specific locations for each backup generator will be finalized in later stages of engineering and design. Prospective locations of all backup generators for each of the potential Project design scenarios (i.e., Option 1, Option 2, and Alternate Green Hydrogen Site) are depicted in Figure 1. The equipment was assumed to be centrally located in each project area (i.e. near the center of each proposed Green Hydrogen site), as it was determined that the equipment would be unlikely to be located near project and/or fenceline boundaries. There are multiple pieces of diesel equipment expected for each of the potential hydrogen facility design scenarios; however, as specific individual locations are not yet known, all units for each Project design scenario were collocated at a single point for the purposes of air dispersion modeling. Point source air dispersion modeling for readiness testing and maintenance was conducted at each location. The results of the modeling are provided in Appendix C of Appendix A.

Figure 1 Emergency Backup Generator Modeling Locations



3 Efficiency, Energy and Energy Resources

3.1 Data Requests DR EEF-1 through DR EEF-3

3.1.1 Data Request DR EEF-1

DR EEF-1: Please provide the manufacturing specification sheets for the backup generators and PEM electrolyzers.

Response: Design details and specifications for the PEM electrolyzer have not been finalized and are not available at this time. Those details will be determined during later stages of design, engineering, and analysis. The proposed manufacturing specifications sheets for the backup generators (LPG-fired backup emergency generator, diesel-fired backup emergency generator, and diesel-fired fire pump engine) are included as Appendix E of Appendix A to this document.

3.1.2 Data Request DR EEF-2

DR EEF-2: Provide the fuel consumption rate of the backup generators (gal/hr).

Response: The fuel consumption rate of the proposed backup generators is anticipated to be approximately 42.7 gallons per hour for the diesel-fired backup emergency generator, approximately 30.6 gallons per hour for the diesel-fired fire pump engine, and approximately 695 cubic feet per hour for the LPG-fired backup emergency generator. These fuel consumption rates all assume operation at 100 percent of the power rating.

3.1.3 Data Request DR EEF-3

DR EEF-3: Provide the energy consumption rate of the PEM electrolyzers (kWh/kg).

Response: The energy consumption rate for the proposed electrolyzer will be approximately 50 to 60 kWh/kg.

4 Greenhouse Gas Emissions (Climate Change)

4.1 Data Requests DR GHG-1 through DR GHG-9

4.1.1 Data Request DR GHG-1

DR GHG-1: Explain how the proposed installation of backup generators at the project site is consistent with the State of California's goal of achieving carbon neutrality no later than 2045.

Response: The Air Quality and Greenhouse Gas Emissions Study (included as Appendix N of the Opt-In Application) estimated GHG emissions from construction and operation of the Project, including operation of the emergency backup generators. Table 19, Annual GHG Emissions, in the Air Quality and Greenhouse Gas Emissions Study summarizes Project emissions and includes operation of the emergency backup generators under line item "Green Hydrogen O&M". As demonstrated in the Air Quality and Greenhouse Gas Emissions Study, the Project would result in a net benefit and overall reduction in GHG emissions, as shown in Table 19, even with inclusion of operation of the emergency diesel backup generators. Therefore, the proposed installation of the emergency backup generators would be consistent with the State of California's goal of achieving carbon neutrality by 2045.

4.1.2 Data Request DR GHG-2

DR GHG-2: What other technologies or fuel alternatives to diesel for the backup generators have you explored and why were they not pursued?

Response: The diesel generators are not intended for normal operations, they are included in the design to address major power supply failures and ensure the safe and reliable shutdown of the proposed hydrogen facility. With safety being the primary interest and given the limited/rare intended usage of the generators, no other alternative technology has been investigated.

4.1.3 Data Request DR GHG-3

DR GHG-3: Has the project applicant explored the procurement of renewable diesel and/or carbon offsets as a means of demonstrating consistency with the State of California's goal of carbon neutrality? If not, why not?

Response: Renewable diesel is being considered. Because the Project as a whole will result in carbon reductions, carbon offsets are not being considered for the generators limited operation for the Project.

4.1.4 Data Request DR GHG-4

DR GHG-4: Please provide a schedule identifying when and how often each of the various means of electricity would provide power to the hydrogen facility (i.e., solar PV, battery storage, grid power, backup generators).

Response: The following information was provided in the response to DR PD-1 in Data Response Set #2. Because offtake contracts have not yet been executed, the ultimate configuration and ratio of solar, hydrogen, and battery storage components of the Project has not been finalized. Therefore, a range of operational scenarios is described herein.

Under the Project, hydrogen would only be produced using renewable energy. When there is no renewable energy supply, no hydrogen would be produced and the facility would remain in standby using electric grid supplied energy for auxiliary systems, such as monitoring equipment, safety systems, pumps, compressors, water treatment and required utilities. When a sufficient supply of renewable energy becomes available, the facility would be able to resume the production of hydrogen. The renewable energy source for the hydrogen electrolyzer would be the Project's solar production, solar-charged BESS, or both at the same time. The precise schedule and balance of the energy supply for the electrolyzer is being analyzed and will be finalized in a later stage of design.

The hydrogen facility would generate hydrogen on average 11 hours per day (4,230 hours per year) but hydrogen facility and electrolyzer supporting equipment would operate 24 hours per day (8,760 hours per year) at approximately 10 percent of power input in stand-by mode, requiring up to 800 MW of energy during hydrogen production and 80 MW when in stand-by mode. Annually, the hydrogen facility would require 3,746,800 MWh (11-hour operating schedule at 800MW and 13-hour operating schedule at 80 MW per day). The facility would produce up to approximately 140 metric tons (approximately 154 tons) of gaseous hydrogen per day.

The final size of the BESS will be optimized to support the electrolyzer facility and/or solar facility. Energy produced by the solar facility in excess of what is consumed by the electrolyzer may be dispatched onto the electric grid, stored in the BESS, or both. The BESS may also be charged by the grid, however if the energy from the BESS is not sourced from renewables it would not be used to power the electrolyzer. A metering system would be employed to measure how much energy stored in the BESS is derived from the grid vs. the solar facility in order to ensure that only the quantity of renewable electricity stored in the BESS would be used to power the electrolyzer.

A co-benefit of this flexible manner of operating the electrolyzer to follow the availability of renewable energy is that the Project would have the ability to elect not to generate hydrogen and instead push those renewable electrons onto the grid during reliability events.

The alternative configuration proposed for the Project is a scenario with no electrolyzer, with the Project consisting of a solar PV facility paired with BESS. See responses to GHG-7 below.

4.1.5 Data Request DR GHG-5

DR GHG-5: Please verify the facility will adhere to the target of 4.0 kgCO_2e/kgH2 for lifecycle greenhouse gas emissions linked to hydrogen production as well as achieving 2.0 kgCO_2e/kgH2 at the site of production, both in standard operating periods (when facility is powered by solar PV, battery storage, grid power and including emissions from readiness testing and maintenance of the backup generators) and times when power is provided by the backup generators.

Response: Table 9 provides a summary of lifecycle GHG emissions associated with construction and operation of the green hydrogen facility, as well as the total anticipated gaseous hydrogen production over the life of the Project. As shown therein, Project construction and operational GHG emissions were re-calculated to take into account Project refinements, resulting in revised GHG emissions calculations for construction, decommissioning, and stationary equipment testing and maintenance emissions (see Appendix B for additional detail). GHG emissions from the Alternate

Green Hydrogen facility building and circuit breakers (sulphur hexafluoride [SF_6] associated with switchyard and substation operations) remain unchanged from the analysis included in Opt-In Application Appendix N, Air Quality and Greenhouse Gas Emissions Study.

In addition, as described in DR GHG-4 above, it is anticipated the hydrogen facility would generate hydrogen on average 11 hours per day (4,230 hours per year) but plant and electrolyzer supporting equipment would operate 24 hours per day (8,760 hours per year) at approximately 10 percent of power input in stand-by mode, requiring up to 80 MW. For the purpose of estimating GHG emissions related to grid demand, it was assumed that 80 MW of grid demand would be required for 8,760 hours per year, a total of approximately 700,800 MWh annually. Using the GHG emissions intensity factor under Pacific Gas and Electric Company's (PG&E) base plan (56 pounds of CO_2e per MWh), further described in DR GHG-8, total GHG emissions from grid demand associated with the green hydrogen facility operation is approximately 17,801 MT CO_2e annually or 623,039 MT over the life of the Project.[2]

As detailed in DR GHG-4 above, the hydrogen facility would produce up to approximately 140 metric tons (MT) of gaseous hydrogen per day or approximately 140,000 kilograms (kg) of gaseous hydrogen per day. The assumed life of the Project is 35 years; therefore, the facility is assumed to produce approximately 1,788,500,000 kg of gaseous hydrogen over the life of the Project.[3] As shown in Table 9, the green hydrogen facility's lifecycle GHG emissions would total 0.40 kg CO_2e/kg H2, which adheres to the target of 4.0 kg CO_2e/kg H2 for lifecycle GHG emissions linked to hydrogen production, as well as achieving 2.0 kg CO_2e/kg H2 at the site of production in standard operating periods when the facility is powered by solar PV, battery storage, grid power and including emissions from readiness testing and maintenance of the emergency backup generators and fire pump engines. As detailed in DR GHG-4, hydrogen would only be produced using renewable energy and would not be produced during emergencies when power is provided by the backup generators; therefore, that scenario was not analyzed in this response.

Table 9 Green Hydrogen Facility Lifecycle GHG Emissions and Hydrogen Production

Activity	Annual Emissions MT CO_2e	Project Lifetime Emissions (35 years) MT CO_2e
Construction Phase		
36-Month Construction[1]	241 (Amortized)	8,437
Decommissioning[2]	241 (Amortized)	8,437
Operational Phase		
Stationary Equipment[3]	161	5,642
SF_6 – Alternate Green Hydrogen Substation and Switchyard	2,008	70,280
Alternate Green Hydrogen Facility Building	2	70
Stand-by Mode Grid Power Demand	17,801	623,039
Total GHG Emissions	20,454 MT CO_2e/year	715,905 MT CO_2e
	20,454,442 kg CO_2e/year	715,905,456 kg CO_2e
Total Gaseous Hydrogen Production	51,100,000 kg H2/year	1,788,500,000 kg

[2] PGE. 2022. Power Content Label. Available at https://www.energy.ca.gov/filebrowser/download/6048. Accessed April 2024.
[3] 35 years * 365 days * 140,000 kg of gaseous hydrogen/day = 1,788,500,000 kg of gaseous hydrogen over the Project lifetime

Activity	Annual Emissions MT CO_2e	Project Lifetime Emissions (35 years) MT CO_2e
Total GHG Emissions per Produced Hydrogen	0.40 kg CO_2e/kg H2	0.40 kg CO_2e/kg H2

Notes: MT = Metric Tons, CO2e = carbon dioxide equivalent, SF6 = Sulphur hexafluoride, H2 = hydrogen

1. 36-Month construction scenario included as a conservative assumption because it would generate the greatest total GHG emissions between the two construction scenarios considered for the Project (18-month and 36-month). In addition, both Phase 1: Site Preparation and Phase 6: Green Hydrogen Facility related construction emissions were included, providing a conservative estimate of construction related emissions because Phase I: Site Preparation includes activities beyond the footprint of the Green Hydrogen Facility.
2. Decommissioning is conservatively assumed to be equal to construction emissions
3. Stationary equipment includes testing and maintenance associated with fire pump engines and emergency backup generators (see emissions calculations in Appendix A)

4.1.6 Data Request DR GHG-6

DR GHG-6: Please explain why the backup generators are needed to support the hydrogen facility if redundant power supplies are already available (e.g., solar PV, battery storage, and grid power). Explain why the facility would not halt the production of hydrogen in the rare cases that power is not available from either solar PV, batteries, or the grid instead of using backup generators to produce hydrogen.

Response: The diesel generators are not intended for normal operation; they are included in the design to address major power supply failures and to ensure the safe and reliable shutdown of the facility. Please refer to the response to DR GHG-4.

4.1.7 Data Request DR GHG-7

DR GHG-7: Clarify whether the BESS would be exclusively charged by onsite PV or if grid power would also be utilized.

Response: Because offtake contracts have not yet been executed, the ultimate configuration and ratio of solar, hydrogen, and battery storage components of the Project has not been finalized. Therefore, a range of operational scenarios is described herein. The following information was provided in the response to DR PD-1 in Data Response Set #2.

The final size of the BESS would be optimized to support the electrolyzer facility and/or solar facility. Energy produced by the solar facility in excess of what is consumed by the electrolyzer may be dispatched onto the electric grid, stored in the BESS, or both. The BESS may also be charged by the grid, however if the energy from the BESS is not sourced from renewables it would not be used to power the electrolyzer. A metering system would be employed to measure how much energy stored in the BESS is derived from the grid versus the solar facility in order to ensure that only the quantity of renewable electricity stored in the BESS would be used to power the electrolyzer.

The alternative configuration proposed for the Project is a scenario with no electrolyzer, with the Project consisting of a solar PV facility paired with BESS. In this scenario, the BESS would generally be charged with solar generation, but it is also expected that the BESS would draw some energy from the grid. It is also possible that a portion of the BESS would not be tied to the solar and would only be tied to the grid.

Adding storage capacity to the California Independent System Operator (CAISO) system enables the storing of energy when it is produced and subsequently discharging that energy when it is most needed, benefiting CAISO, ratepayers, utilities, and independent power producers. With the aggressive California state renewable energy and zero-carbon electric supply targets accelerating the renewable generator buildout, the energy on the grid is becoming increasingly green. Moreover, the lowest priced energy often occurs in the middle of the day, when solar facilities across the state are simultaneously operating at full capacity, which results in the optimal time to charge batteries with an increasingly higher percentage of green energy. Furthermore, enabling grid charging also allows the batteries to provide critical reliability enhancing ancillary services to the grid, such as frequency regulation and spinning reserves.

4.1.8 Data Request DR GHG-8

DR GHG-8: If the BESS system would also be charged by the grid, calculate the indirect GHG emissions. Provide assumptions for the number of hours annually the BESS system could be charged by the grid, the loss in round-trip efficiency for the charging/discharging cycle, and the GHG emission intensity factor from the electrical grid during charging.

Response: The average loss in round-trip efficiency for the life of the BESS is 13 percent. Assuming the 4,600 megawatt-hour (MWh) BESS completes 1 full cycle per day and is wholly grid charged, this would require approximately 4.2 hours of charging at full capacity per day and results in approximately 251,000 MWh of lost round-trip efficiency per year.[4]

PG&E is the energy provider that would serve the Project. The most recently available Power Content Label published by the California Energy Commission for PG&E indicates that the GHG emissions intensity factor under the base plan is 56 pounds of CO_2e per MWh.[5] Therefore, annual indirect GHG emissions from round-trip efficiency loss would total approximately 6,376 MT CO_2e, if the BESS were charged only by the grid. While the GHG emission intensity factor is representative of the grid on a calendar year basis, the hourly period at which the charging occurs is meaningful. BESS charging occurs when prices are lowest and supply is highest, which in California occurs during the middle of the day from an abundance of clean solar energy. This estimate also assumes current (2022) emission intensity factors for PG&E-provided electricity and does not take into account reductions in emission intensity factors over the life of the Project as additional renewable energy is added to PG&E's power mix.

4.1.9 Data Request DR GHG-9

DR GHG-9: Please explain how the 17,415 metric tons of CO_2e was derived for BESS cooling (e.g., refrigerant cooling leakage?) and explain whether these emissions would occur during construction or operation.

Response: Project construction and operational GHG emissions were re-calculated to take into account Project refinements (see Appendix B for additional detail). The 17,415 MT of CO_2e previously associated with energy demand from BESS cooling during Project operation was removed from the analysis because as detailed on page 37 of the Air Quality and Greenhouse Gas Emissions Study (Opt-In Application Appendix N) "this energy consumption is anticipated to be offset by the power generated at the site."

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[4] (4600 / (1 - 13%) - 4600) * 365 = 250,885 MWh

[5] PGE. 2022. Power Content Label. Available at https://www.energy.ca.gov/filebrowser/download/6048. Accessed April 2024.

5 Hazardous Materials Handling

5.1 Data Request DR HAZ-1

5.1.1 Data Request DR HAZ-1

DR HAZ-1: Please provide the following environmental site assessment reports from Stantec Consulting Services:

a. Phase I Environmental Site Assessment, Forty-Two Parcels (9,116 Acres) Northwest of SR-145 and Mt Whitney Avenue, Fresno County, California.
b. Phase II Environmental Site Assessment and Limited Soil Sampling, Generation Tie Line Easement and Support Facilities, Northwest if SR-145 and Mt Whitney Avenue, Fresno County, California.
c. Phase II Environmental Site Assessment, Forty-Two Parcels (9,116 Acres) Northwest of SR-145 and Mt Whitney Avenue, Fresno County, California.

Response: The Phase I and II Environmental Site Assessments referenced are included as Appendix F to this document.

6 Public Health

6.1 Data Requests DR PH-1 through DR PH-5

6.1.1 Data Request DR PH-1

DR PH-1: Certain citations are missing from the reference list. Please include the institution names instead of leaving them blank.

Response: All citations have been confirmed in the reference list. Continuation markings (blanks) have been removed and institution names have been included. The updated reference list for Section 5.8 of the Opt-In Application is provided as Appendix G to this document.

6.1.2 Data Request DR PH-2

DR PH-2: Regarding fugitive dust and exhaust, please verify if there are any additional mitigation measures for use during construction, such as vehicle speed on unpaved roads and loose materials covering and limitations on idling running time for diesel equipment.

Response: Fugitive dust is regulated by the SJVAPCD as detailed in The Air Quality and Greenhouse Gas Emissions Study (Appendix N of the Opt-In Application). As stated in Appendix N, the Project would be required to comply with SJVAPCD Regulation VIII (Fugitive PM_{10} Prohibitions). The requirements of this regulation that are applicable to the Project are contained in Table 3 SJVAPCD Rule 8021 Measures Applicable to the Project in Section 2.2.1 of Appendix N, which includes limiting vehicle speeds on unpaved roads and the preparation of a dust control plan which will outline any additional measures that would be implemented to control dust from loose materials. Regulation VIII also contains requirements to maintain a minimum of 6 inches of freeboard or be covered when hauling bulk materials (including soils).

The Project is also subject to California Air Resources Board's Regulation for In-Use Off-Road Diesel-Fueled Fleets, which limits unnecessary idling of vehicles or engines to no more than five consecutive minutes at one location. This applies to all Project construction equipment.

6.1.3 Data Request DR PH-3

DR PH-3: One of the values in Chronic Risk Option 2 point of maximal impact (PMI) exceeds the threshold significantly. Please check this discrepancy and review the remaining results.

Response: A review of the data was conducted. The value that was pointed out as exceeding thresholds (4.2E+03) was an error in reporting. The actual PMI value for Chronic Risk Option 2 should be 2.95E-3.

6.1.4 Data Request DR PH-4

DR PH-4: Please conduct acute exposure analysis by categorizing diesel exhaust into the primary toxic air contaminants.

Response: An acute exposure analysis for toxic air contaminant (TAC) emissions (including diesel exhaust) from proposed stationary sources was performed during the development of the preliminary draft air permit application, included as Appendix A to this document. The acute exposure analysis used speciation factors provided by the CEC. Short-term (i.e., hourly) TAC emissions were input into the CARB Hotspots Analysis and Reporting Program Version 2 (HARP2), which is a program that assists with the calculations required to conduct a health risk assessment (HRA). Impacts were below significance thresholds. Please refer to Section 4.2, Health Risk Assessment, of the preliminary draft air permit application (Appendix A).

6.1.5 Data Request DR PH-5

DR PH-5: Please provide the proposed point source locations of all backup generators and provide the modeling results of diesel PM from readiness testing and maintenance operations by treating the stationary sources as point sources at each of the proposed locations.

Response: The proposed locations of all backup generators for each of the potential Project design scenarios are described in the response to DR AQ-12 and depicted in Figure 1. Point source air dispersion modeling for readiness testing and maintenance was conducted at each location. The results of the modeling are provided in Appendix C to Appendix A.

7 Socioeconomics

7.1 Data Requests DR SOCIO-1 (Resubmitted)

7.1.1 Data Request DR SOCIO-1 (Resubmitted)

This data response was previously provided with Data Response Set #2. The original response incorrectly referenced color-coding in Table 5; therefore, this response is being resubmitted with the errors corrected.

DR SOCIO-1: Per Appendix B (g) (7) (A) (iv), provide the availability of skilled workers by occupation for operation the project.

Response: The Project will require an estimated 40 permanent full-time employees plus one full-time equivalent contract employee for grounds maintenance. It is estimated that the solar and hydrogen facilities will require two operations managers each and 36 additional technician-level staff.

To determine availability, these employment positions were assigned to occupations, which allows comparison with data on labor availability by occupation from the Bureau of Labor Statistics. The Bureau of Labor Statistics does not define a green hydrogen technician occupation; therefore, the Solar PV Installers occupation was utilized as a substitute. Solar PV Installers (SOC code 47-2231) occupation description covers installation and maintenance of solar PV systems. Table 4 details operational employment by component and occupation.

Table 4 DR SOCIO-1 Operational Employees in Full-time Equivalent

SOC Code	Occupation Title	PV Solar	BESS	Hydrogen	Contract Employment
11-3000	Operations Specialties Managers	2	0	2	0
47-2231	Solar PV Installers	10	4	22	0
37-0000	Building and Grounds Maintenance	0	0	0	1

Across the study area (Fresno-Madera Metropolitan Statistical Area [MSA], comprised of Fresno, Madera, and Kings counties), the Project would require approximately one percent of all Operations and Specialties Managers, 14 percent of Solar PV Installers, and less than one percent of Building and Grounds Maintenance employment. Table 5 shows Project labor as a share of available regional labor, divided into components and shows a combined total. The shading in the table highlights where the percentage of Project operations labor demand exceeds certain thresholds. The dark blue shows Project demand exceeding 10 percent of available labor. Light blue shows Project demand between 6.4 percent—the current unemployment rate for Fresno County where more than half of the regional workforce is centered—and 10 percent of available labor. White indicates Project demand that is less than the unemployment rate of 6.4 percent.

Table 5 DR SOCIO-1 Operational Labor Demand as Share of Regional Employment

SOC Code	Occupation Title	PV Solar	BESS	Hydrogen	Contract Employment	Total
11-3000	Operations Specialties Managers	0.6%	0.0%	0.6%	0.0%	1.2%
47-2231	Solar PV Installers	4.0%	1.6%	**8.8%**	0.0%	**14.4%**
37-0000	Building and Grounds Maintenance	0.0%	0.0%	0.0%	0.0%	0.001%

Source: IP Darden, 2023; BLS, OEWS, 2022.

= Project demand between 6.4 and 10 percent of available labor

= Project demand exceeding 10 percent of available labor

- For all occupations where Project demand as a share of regional employment is below the unemployment rate (cells in white in Table 5), it is assumed the Project would be able to hire sufficient workers locally to fill all (100 percent of) positions.
- For occupations where Project demand as a share of regional employment is above the unemployment rate (6.4 percent) but below 10 percent of the average regional total (cells in light blue in Table 5), it is assumed the Project could have sufficient influence to hire upwards of 100 percent if managers provide sufficient incentives, given the lower numbers needed in these occupation categories, but it is assumed 75 percent would be hired locally to provide a conservative estimate.
- For occupations where Project demand as a share of regional employment is above 10 percent of the average regional total (cells in dark blue in Table 5), it is assumed the Project could hire a substantial number from the local region with sufficient incentives, but not 100 percent given the high numbers of workers needed and the tight labor market in construction in this region. In this case, it is assumed 50 percent would come from the local area.

Table 6 shows the result of applying these assumptions to the Project operational workforce. All Operations Specialties Managers and contract employees are anticipated to live and work in the study area (i.e., "local"). However, half of the employed Solar PV Installers, who will service and maintain the solar, BESS, and hydrogen components of the Project, are anticipated to live outside of the study area or relocate to the study area.

Table 6 DR SOCIO-1 Estimate of Local and Non-Local Operational Workforce

Occupation Title	Share Local	Local Operational Workforce	Non-Local Operational Workforce
Operations Specialties Managers	100%	4	0
Solar PV Installers	50%	18	18
Building and Grounds Maintenance	100%	1	0
Total		**23**	**18**

Source: ECONorthwest analysis, 2023

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