CERTIFICATION AND FINANCING PROPOSAL

ENERSMART ENERGY STORAGE PORTFOLIO
IN SAN DIEGO, CALIFORNIA

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EXECUTIVE SUMMARY

ENERSMART ENERGY SOTRAGE PORTFOLIO IN SAN DIEGO, CALIFORNIA

Project: The proposed project consists of the design, construction and operation of a portfolio of 44 energy storage systems with a combined capacity of 132 megawatts of alternating current (MW_{AC}) in San Diego, California (the "Project" or the "Portfolio"). The Project will provide energy, ancillary services and resource adequacy (altogether, the "Products") to the California power grid.[1] Electricity from the grid will be stored and delivered through specific Gen-Tie lines to be built by San Diego Gas & Electric (SDG&E).[2] The Products will be offered and purchased through the California Independent System Operator (CAISO) wholesale energy and ancillary services markets.

Project Objective: The purpose of the Project is to increase the energy storage capacity of the California grid, which will allow the system operator to reduce the use of ramp-up/ramp-down fossil-fuel power generating plants and manage the grid more efficiently. The Project will also help integrate electricity generated by intermittent renewable energy sources, such as solar and wind, and will support a more efficient and reliable power grid by minimizing power disruptions and reducing energy losses resulting from mismatches in supply and demand.

Expected Outcomes: The estimated outcomes resulting from the installation of 132 MW_{AC} of energy storage capacity are:

- Reduction of approximately 31,100 metric tons/year of carbon dioxide (CO_2).[3]

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[1] Ancillary services are those required to support the transmission of electric power from the seller to the purchaser, such as energy regulation up and down, voltage support and frequency control, among others. Resource adequacy benefits refers to the rights and privileges attached to any generating resource that satisfies the resource adequacy obligations of any entity.

[2] A Gen-Tie line is a transmission line built for the purpose of interconnecting a new generation facility into the power grid.

[3] CO_2 calculations are based on the potential emissions avoided as a result of: (i) charging and discharging 52,650 megawatt-hour (MWh)/year of electricity for frequency control purposes, which would otherwise be supplied by natural gas-fired power plants, and on the emission factor for natural gas plants in the state of California, calculated by NADB based on information reported by the U.S. Energy Information Administration (EIA) and the California Energy Commission; and (ii) charging and discharging 35,000 MWh/year of electricity from the sale of energy based on the California energy matrix. The CO_2 emission factor for frequency regulation is 0.456 metric tons/ MWh. The CO_2 emission factor for energy sales is 0.202 metric tons/MWh. Although reductions in the emission of sulfur dioxide (SO_2) and nitrogen oxides (NOx) are also expected, emission factors related to the production of electricity generated by natural gas plants and by the California energy matrix were negligible.

- Storing and delivering up to 87,650 megawatt-hours (MWh) of energy output per year.[4]

Project Sponsor: EnerSmart Storage Operating LLC.

Borrower: EnerSmart Storage Operating II, LLC, a special-purpose vehicle to be formed by the Sponsor.

NADB Loan: Up to US$70 million.

[4] Estimation based on information provided by the Sponsor. The Portfolio is expected to complete the equivalent of up to 332 charge/discharge cycles per year.

CERTIFICATION AND FINANCING PROPOSAL

ENERSMART ENERGY STORAGE PORTFOLIO IN SAN DIEGO, CALIFORNIA

1. PROJECT OBJECTIVE AND EXPECTED OUTCOMES

The proposed project consists of the design, construction, and operation of a portfolio of 44 energy storage projects with a combined capacity of 132 megawatts of alternating current (MW_{AC}) in San Diego, California (the "Project" or the "Portfolio"). The Project will provide energy, ancillary services and resource adequacy (altogether, the "Products") to the California power grid.[5] Electricity from the grid will be stored and delivered through specific Gen-Tie lines to be built by San Diego Gas & Electric (SDG&E).[6] The Products will be offered and purchased through the California Independent System Operator (CAISO) wholesale energy and ancillary services markets.

The purpose of the Project is to increase the energy storage capacity of the California grid, which will allow the system operator to reduce the use of ramp-up/ramp-down fossil-fuel power generating plants and manage the grid more efficiently. The Project is expected to store and deliver up to 87,650 megawatt-hours (MWh) of energy a year. As a result, it will displace the emission of an estimated 31,100 metric tons/year of carbon dioxide (CO_2).[7] The Project will also help integrate electricity generated by intermittent renewable energy sources, such as solar and wind, and support a more efficient and reliable power grid, by minimizing power disruptions and reducing energy losses resulting from mismatches in supply and demand.

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2. ELIGIBILITY

2.1. Project Type

The Project falls into the category of clean and efficient energy.

2.2. Project Location

The Portfolio will be constructed on eight sites covering a total of approximately 2.65 acres of private land. All the sites are located within San Diego County in the state of California and within the 100-kilometer U.S.-Mexico border region. Rancho Bernardo, the site furthest from the international border, is approximately 34 miles (55 km) north of Tijuana, Baja California. Figure 1 illustrates the geographical location of the Portfolio.

Figure 1
PROJECT LOCATION MAP

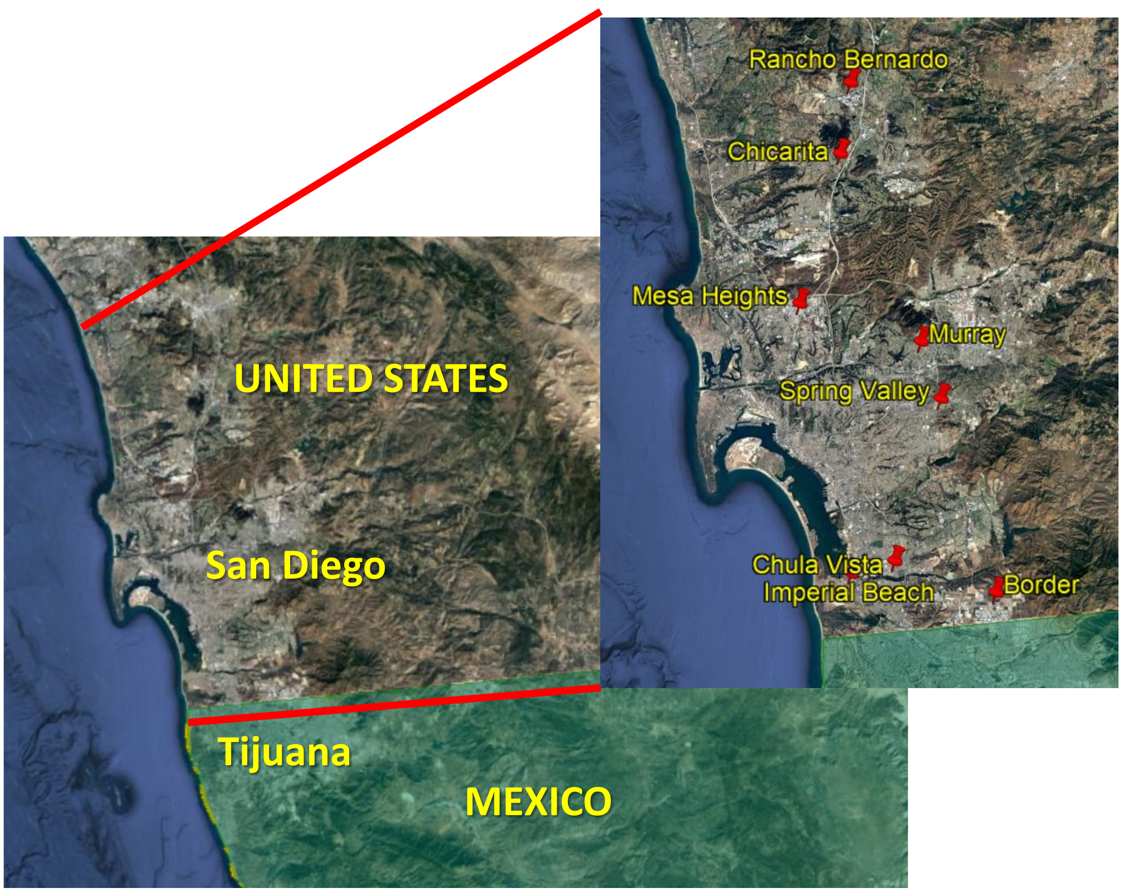


Table 1 provides the coordinates of each of the eight Project sites.

Table 1
GEOGRAPHICAL COORDINATES OF THE PROJECT SITES

Site	Latitude	Longitude
Chula Vista	32º35’40” N	117º3’3” W
Murray	32º47’24” N	117º1’22” W
Mesa Heights	32º49’26” N	117º9’5” W
Imperial Beach	32º35’1” N	117º5’49” W
Rancho Bernardo	32º1’16” N	117º5’50” W
Spring Valley	32º44’22” N	117º0’7” W
Chicarita	32º57’28” N	117º6’29” W
Border	32º33’59” N	116º56’38” W

Table 2 presents the area of each of the eight Project sites.

Table 2
PROJECT SITES AREA

Site	Area (acres)
Chula Vista	0.143
Murray	0.524
Mesa Heights	0.060
Imperial Beach	0.119
Rancho Bernardo	0.143
Spring Valley	0.357
Chicarita	0.595
Border	0.714

2.3. Project Sponsor and Legal Authority

The private-sector project sponsor is EnerSmart Storage Operating LLC (the “Sponsor”). The Sponsor will form a special-purpose vehicle, Enersmart Storage Operating II, LLC, to implement the Project and contract the financing (the “Borrower”).

3. CERTIFICATION CRITERIA

3.1. Technical Criteria

3.1.1. General Community Profile

According to the U.S. Census Bureau, the population of San Diego County in 2019 was 3,338,330, which represented 8.4% of the state population.[8] The main economic activities are: trade (28%); professional services (25%); health care (17%); and manufacturing (10%).[9]

The implementation of the Project is expected to benefit San Diego County by improving grid reliability, increasing energy efficiency and maximizing renewable energy use, while reducing the use of ramp-up/ramp-down fossil-fuel power generating plants. The 132-MW_{AC} energy storage portfolio will be capable of storing up to 264 MWh of electricity, the equivalent of serving 88,000 customers for two hours.[10]

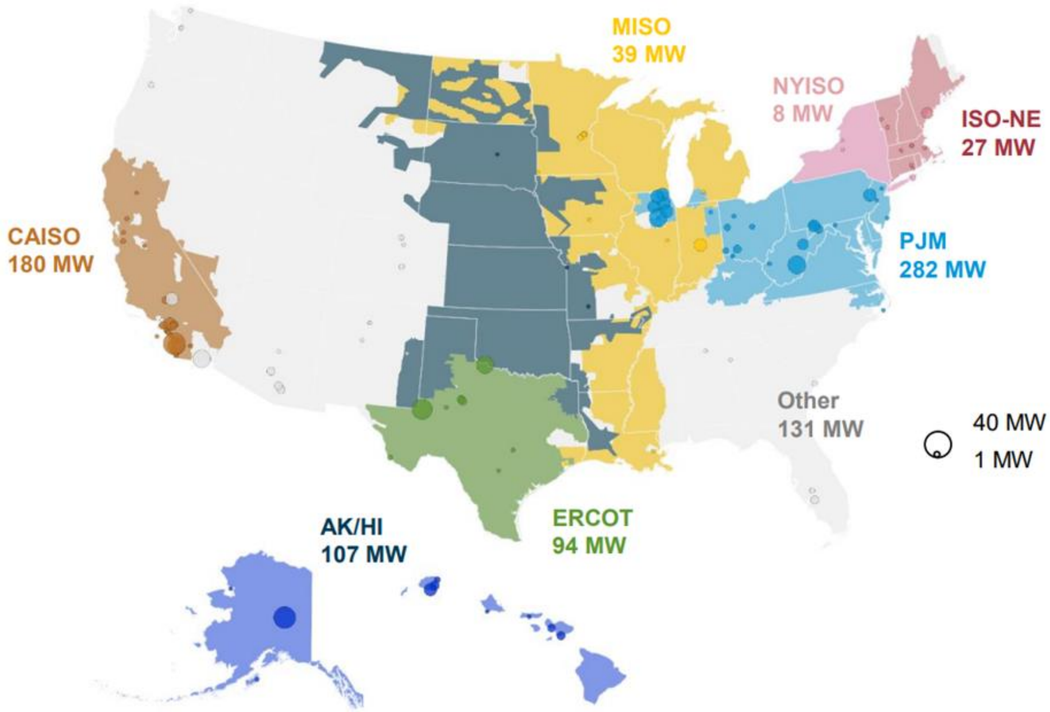
The Project is also expected to benefit San Diego County by creating employment opportunities and additional income during its construction and operation. Approximately 100 jobs are expected to be generated during construction. Since the Project will for the most part be operated remotely, no permanent on-site jobs are expected to be generated during Project operation; however, several off-site jobs will be generated during its operation, including some administrative positions.

Local Energy Storage Profile

In July 2020, EIA published the U.S. Battery Storage Market Trends report. According to the report, large-scale battery storage power capacity in the United States has grown in recent years with the total number of operational battery storage systems more than doubling since 2015, for a total of 125 with a combined installed capacity of 869 MW as of the end of 2018. Figure 2 shows the location of large-scale battery storage facilities in the U.S. in 2018.

[8] Source: U.S. Census Bureau, (https://www.census.gov/quickfacts/fact/table/sandiegocountycalifornia,US/POP010220).
[9] Source: U.S. Census Bureau, (https://data.census.gov/cedsci/table?q=San%20diego%20county&t=Value%20of%20Sales,%20Receipts,%20Revenue,%20or%20Shipments&tid=ECNBASIC2017.EC1700BASIC&hidePreview=true)
[10] The estimation is based on 1.5 kilowatt-hours of electricity consumption per customer per hour according to a press release by SDG&E (http://newsroom.sdge.com/battery-storage/sdge-unveils-world%E2%80%99s-largest-lithium-ion-battery-storage-facility).

Figure 2
U.S. LARGE-SCALE BATTERY STORAGE FACILITIES BY REGION (2018)



Source: EIA | US. Battery Storage Market Trends

As shown in Figure 2, about 21% of large-scale battery storage capacity in the United States is installed within the service area of the California Independent System Operator (CAISO), where the Project will be constructed. In addition, four California utilities account for nearly 90% of small-scale storage power capacity in the United States in 2018.[11] According to the EIA, CAISO had a total of 180 MW of installed power storage capacity in 2018.

As of December 2019, project developers had reported to EIA that 3,616 MW of large-scale battery storage was expected to become operational in the United States between 2020 and 2023. Given the short planning period required to install a storage facility, the planned capacity reported to EIA does not necessarily reflect all the storage that will be built over this period, but the estimates can be used as an indicator of trends.[12] California accounted for 38% of planned battery storage power capacity reported as of December 2019.

Also, the Annual Energy Outlook 2020 provides projections on supply and demand needs for energy markets in the United States through 2050. The reference case, which assumes implementation of current U.S. laws and policies, projects large-scale battery storage capacity to grow from 1 GW in 2019 to 17 GW in 2050.

[11] Source: EIA, *Battery Storage in the United States: An Update on Market Trends*, July 2020. Small-scale refers to systems connected to the distribution network with a nameplate power capacity of less than 1 MW.
[12] Source: Ibid.

On February 15, 2018, the U.S. Federal Energy Regulatory Commission (FERC) issued FERC Order 841, which requires independent system operators (ISOs) and regional transmission organizations (RTOs) to remove barriers to the participation of electric storage resources in the capacity, energy and ancillary services markets. Each ISO/RTO under FERC jurisdiction was required to revise its tariff to include market rules that recognize the physical and operational characteristics of electric storage resources and to implement the revisions upon approval of tariff compliance by FERC.[13]

In addition, most policy actions involving energy storage have been at the state level and include setting procurement mandates, establishing incentives and requiring that storage be incorporated into long-term planning mechanisms. California has introduced several measures related to energy storage. In 2013, the California Public Utility Commission (CPUC) implemented Assembly Bill 2514 by setting a mandate for its investor-owned utilities to procure 1,325 MW of energy storage across the transmission, distribution, and customer levels by 2020. All of the capacity must be operational by 2024. In May 2017, CPUC implemented Assembly Bill 2868 by ordering its investor-owned utilities to procure up to an additional 500 MW of distributed energy storage, including no more than 125 MW of customer-sited energy storage.[14] The Self-Generation Incentive Program has designated US$48.5 million in rebates for residential storage systems that are 10 kW or smaller and US$329.5 million for storage systems larger than 10 kW.[15]

Power generation in California relies on a mix of energy technologies as shown in Table 3.

Table 3
CALIFORNIA POWER GENERATION IN 2019

Energy Source	Generation* (GWh)	Percentage (%)
Natural gas	95,057	34.23
Large hydroelectric	40,603	14.62
Solar	34,090	12.28
Wind	28,249	10.17
Nuclear	24,945	8.98
Unspecified	20,376	7.34
Geothermal	13,260	4.77
Coal	8,232	2.96
Biomass	6,787	2.44
Small hydroelectric	5,645	2.03
Oil	36	0.01
Other	422	0.15
Total	**277,702**	**100**

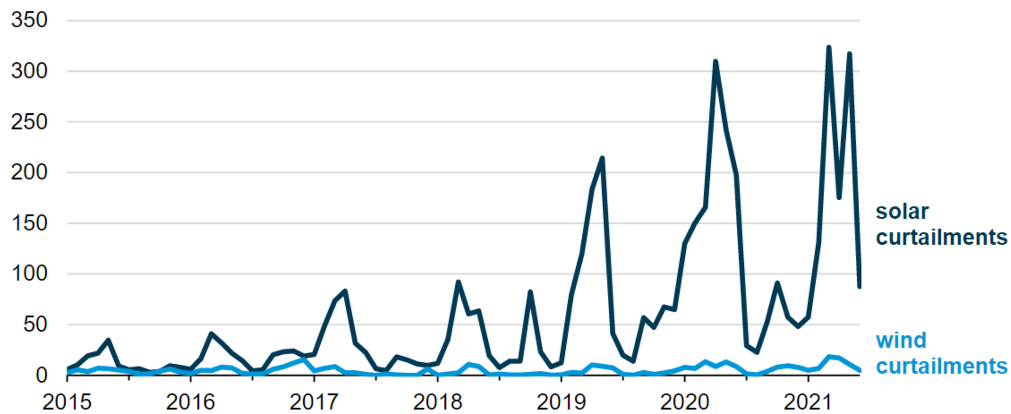
* Source: California Energy Commission, 2019 Total System Electric Generation.

California emitted 40.87 million metric tons of CO_2 from fossil fuel consumption in the electricity sector in 2019. Emissions of carbon dioxide equivalent (CO_2e) related to electricity generation

[13] Source: EIA, Battery Storage in the United States: An Update on Market Trends, July 2020.
[14] Source: EIA, Battery Storage in the United States: An Update on Market Trends, July 2020.
[15] Source: EIA, Battery Storage in the United States: An Update on Market Trends, July 2020.

represented 15% of greenhouse gas emissions from the state of California in 2018.[16] To reduce the emissions associated with power generation, the State Legislature has adopted several policies. One of these policies is the California Renewables Portfolio Standard (RPS) program which was instituted by SB 1078 in 2002. In addition, in 2018 SB 100 expanded California's commitment to clean energy by increasing the State's RPS to 60% by 2030 and requiring 100% of California's electricity to come from carbon-free resources by 2045.[17] Nevertheless, curtailments of solar-powered electricity generation have increased in the CAISO region as shown in Figure3. In 2020, CAISO curtailed 1.5 million megawatt hours of utility-scale solar, or 5% of its utility-scale solar production.

Figure 3
MONTHLY CURTAILMENTS BY CAISO
(THOUSAND MEGAWATT HOURS)



Source: EIA | Today in Energy August 24, 2021

To reach California's goals of 100% zero carbon electricity resources and enhanced resiliency, the State will need to continue to advance policies and investments in energy storage. CAISO is expecting to add 2.5 GW of battery storage capacity in 2021. Renewable generators can charge these batteries with electricity that would otherwise have been curtailed.

3.1.2. Project Scope

The Project consists of the design, construction, and operation of a portfolio of 44 energy storage facilities with a combined capacity of 132 megawatts of alternating current (MW_{AC}). Each system will have 3 MW_{AC} of power capacity. The Portfolio will be constructed on eight Project sites covering an area of 2.65 acres in San Diego County, California. Each system will be connected to the grid at a distribution level of 12-kV. SDG&E will be responsible for installing all the Gen-Tie lines that will connect the systems to the grid.

Each 3-MW_{AC} system configuration includes the following components:

[16] Source: California Energy Commission, California Clean Energy Almanac 2020.
[17] Source: California Public Utilities Commission, 2020 Annual Report.

- *Battery cells*. The lithium-ion power cells will have a nominal capacity of up to 320 ampere-hour (Ah) with a working voltage of 3.2 volts in direct current (V_{DC}).[18] A total of 2,736 battery cells is expected to be installed per 3-MW_{AC} system.

- *Battery pack*. Each system will have 24 battery packs. Each battery pack will have its own controller to monitor its performance.

- *Battery string*. A battery string is comprised of three battery packs and a controller. Each system will have eight battery strings.

- *System controller*. Using a management software for system operation and control, the system controller interacts with metering devices, system hardware and stored electricity to regulate power. It accepts commands remotely from customer sites or can execute operations locally as defined by use cases in a program. The system controller monitors the voltage and temperature of single cells and the current of the battery string in real time. It also calculates the state of charge (SOC) of the battery string, sends an alarm notification and takes protective actions. Finally, it can serve as an interface for maintenance.

- *Energy storage inverter*. The energy storage inverter converts and conditions the power going in and out of the battery system. It transforms the direct current from the batteries into alternating current. Each system will require three inverters. Inverters will have communication capabilities and security control mechanisms.

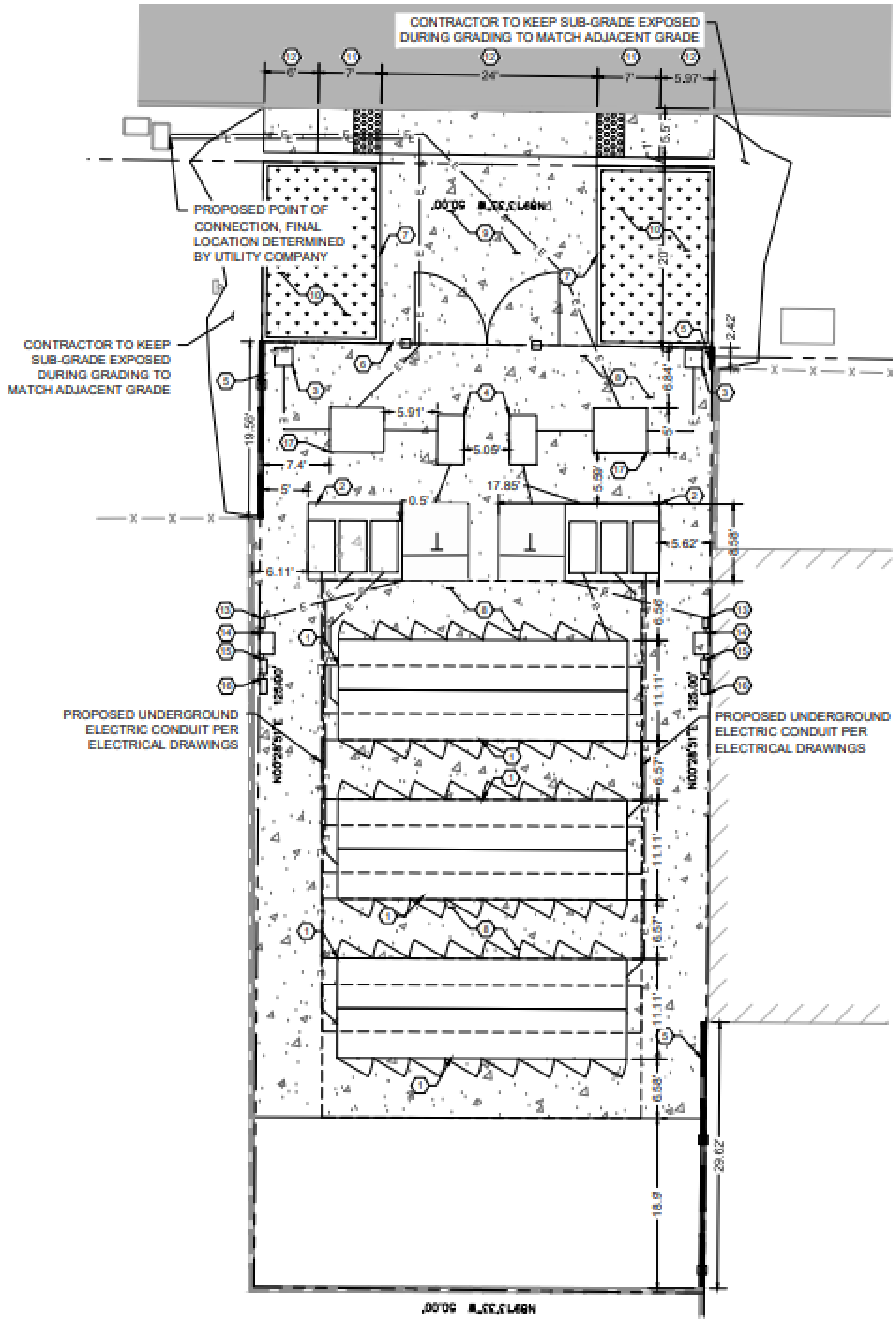
- *Transformer*. The transformer converts the electricity from 12 kV_{AC} to 480 V_{AC} to allow the system to receive electricity from the grid, as well as from 480 V_{AC} to 12 kV_{AC} to deliver the electricity back to the grid.

- *Gen-Tie lines*. Each system will be connected to the grid through a designated 12-kV_{AC} transmission line.

Each 3-MW_{AC} system is comprised of three energy storage containers, three inverters, one transformer, one switch box, and one transmission line. More than one system may be housed in the same facility, but each one is self-contained and operates independently from the other system(s). Figure 4 shows a schematic of the proposed 6-MW_{AC} Chula Vista energy storage facility, which will house two 3-MW_{AC} systems.

[18] An ampere-hour is used in measurements of electrochemical systems such as battery capacity.

Figure 4
6-MW$_{AC}$ Project Schematic



The following table includes the number of systems and the expected energy storage capacity to be developed at each of the eight Project sites.

Table 4
NUMBER OF SYSTEMS AND STORAGE CAPACITY PER SITE

Site	Systems	Storage Capacity [MW_{AC}]
Chula Vista	2	6
Murray	7	21
Mesa Heights	1	3
Imperial Beach	4	12
Rancho Bernardo	4	12
Spring Valley	6	18
Chicarita	10	30
Border	10	30
TOTAL	**44**	**132**

Each system will require an Interconnection Agreement with SDG&E before it enters into operation. Technical requirements for each interconnection include: (i) metering; (ii) protection and control; (iii) operating requirements; (iv) operating procedures; and (v) energization and synchronization.

3.1.3. Technical Feasibility

Lithium-ion technology is a common battery storage medium and is considered one of the safest, most easily understood and most efficient methods of energy storage on the market. It is the technology most often used for this application given its high-cycle efficiency and fast-response time. At the end of 2018, lithium-ion batteries represented more than 90% of the installed power capacity of large-scale battery storage in operation in the United States.[19] Their high energy density makes them the current battery of choice for the portable electronic and electric vehicle industries.

Potential suppliers were evaluated based on such elements as cost-effectiveness, contractual terms, warranties and delivery times. The Sponsor selected BYD, an energy storage and battery management solutions company, to supply the facility components, having determined that its equipment is best suited for the characteristics and requirements of the Project and offers the best performance. For the construction of each system, the Sponsor will evaluate proposals to select an EPC contractor to perform this task.

The Sponsor contracted the services of an independent engineering firm to perform a technology assessment. The analysis will include an evaluation of the characteristics, reliability and performance of all the system components, as well as a power conversion analysis and a review of product certifications, supplier warranties, etc. The review will include the suitability of the proposed energy storage system to perform the required power applications, as well as its integration to the local electricity grid. Also, as part of the assessment, the independent engineer will evaluate the expected storage capacity degradation due to the charge and discharge cycles.

[19] Source: EIA, Battery Storage in the United States: An Update on Market Trends, July 2020.

Finally, the independent engineer will evaluate the project contracts including the EPC and supply agreements.

Once the batteries reach the end of their useful life, the Sponsor will recycle them in accordance with applicable regulation. Also, upon termination of the corresponding lease agreements, all sites will be restored to their original condition.

3.1.4. Land Acquisition and Right-of-Way Requirements

The Project will be built at eight sites, all located within San Diego County. The Sponsor has secured seven of the eight sites through lease agreements for up to 20-years. The Sponsor expects to secure the pending site through a lease agreement to be executed in September 2021. All the systems are in zones where the land use allows for the construction and operation of energy storage facilities. Prior to construction of each project component, the Sponsor will obtain the corresponding land use permits.

In addition, prior to initiating construction of each system, a building permit will be required. As part of their evaluation and approval process, local authorities will review the plans, electrical drawings and manufacturer specification sheets for each system, which detail the expected improvements to the space where each project component will be housed.

Table 5 presents the lead authorities with jurisdiction over each of the eight project sites.

Table 5
AUTHORITY WITH JURISDICTION OVER PROJECT SITES

Site	Authority
Chula Vista	City of Chula Vista
Murray	City of La Mesa
Mesa Heights	City of San Diego
Imperial Beach	City of San Diego
Rancho Bernardo	San Diego County
Spring Valley	San Diego County
Chicarita	City of San Diego
Border	City of San Diego

SDG&E will be responsible for installing each of the 12-kV Gen-Tie lines, which will connect each system to the local grid. When necessary, SDG&E will be responsible for obtaining the corresponding rights of ways for the interconnection lines.

3.1.5. Project Milestones

Construction at each of the eight project sites will start and be completed independently of each other. Table 6 presents the construction schedule for each project site along with the expected Commercial Operation Date.

Table 6
PROJECT CONSTRUCTION SCHEDULES

Site	Construction Start-up	Commercial Operation Date
Chula Vista	November 2021	February 2022
Murray	April 2022	September 2022
Mesa Heights	July 2022	November 2022
Imperial Beach	July 2022	November 2022
Rancho Bernardo	January 2023	May 2023
Spring Valley	January 2023	June 2023
Chicarita	January 2023	June 2023
Border	December 2022	April 2023

Table 7 presents the status per site of key milestones for Project implementation.

Table 7
PROJECT MILESTONES

Site	Lease Agreement	Interconnection Agreement	Zoning/Planning Approval
Chula Vista	Executed	Executed	Not required
Murray	Executed	Executed	Not required
Mesa Heights	Executed	Draft (January 2022)	Pending (January 2022)
Imperial Beach	Executed	Draft (January 2022)	Pending (January 2022)
Rancho Bernardo	Executed	Draft (July 2022)	Pending (July 2022)
Spring Valley	Executed	Draft (June 2022)	Pending (June 2022)
Chicarita	Executed	Draft (July 2022)	Pending (July 2022)
Border	Pending (September 2021)	Pending (June 2022)	Pending (June 2022)

3.1.6. Management and Operation

The Sponsor will act as asset manager and will engage BYD and other original equipment manufacturers (OEMs) to provide maintenance to the storage systems and to the balance of plant (inverters, transformers, switch boxes, etc.). The Sponsor will rely on a third party to operate the facilities remotely through monitoring systems and equipment. The Sponsor will also have another third party responsible for placing trades on the CAISO market for the sale of energy and of ancillary services.

3.2. Environmental Criteria

3.2.1. Environmental and Health Effects/Impacts

A. Existing Conditions

Historically, the United States has depended to a great extent on fossil fuels for the generation of energy. This conventional method of energy generation can affect the natural environment due to harmful emissions related to the generation process, including greenhouse gases (GHG) and other pollutants, such as sulfur dioxide (SO_2) and nitrogen oxides (NOx). Consequently, there is a need for affordable and environmentally beneficial alternatives to conventional hydrocarbon-based energy sources.

In California, in 2019, a total of 41 million metric tons of CO_2 were emitted by conventional power plants.[20] California has established a series of policies and regulations aimed at reducing these emissions. One of the most important is the Renewables Portfolio Standard (RPS) Program, which in 2002 mandated, through Senate Bill 1078, an initial requirement that 20% of electricity retail sales be generated by renewable resources by 2017. The program was accelerated in 2015 through Senate Bill 350, which established a 50% RPS by 2030. Senate Bill 350 also included interim annual RPS targets with three-year compliance periods and requires that 65% of RPS procurement be derived from long-term contracts of 10 or more years. In 2018, Senate Bill 100 was signed into law, increasing the RPS to 60% by 2030 and requiring that all the electricity in the state come from carbon-free resources by 2045.

In line with those policies, power generation from renewable sources has increased in the state of California. In 2019, solar parks and wind farms generated more than 22% of the electricity consumed in California. Given the intermittent nature of these renewable energy sources, grid operators must have the capability to regulate and maximize the efficient use of electricity in the grid. One of the simplest and most efficient solutions is the implementation of energy storage systems.

ISOs and RTOs—the independent, federally-regulated non-profit organizations that ensure service reliability and optimize supply and demand bids for wholesale electric power in the United States—must ensure that market rules do not unfairly preclude any resources from participating in the production of electricity, as enforced by FERC. Many existing market rules may not take into account the unique operating parameters and physical constraints of battery storage as both a consumer and producer of electricity. However, recent actions by FERC, ISOs and RTOs have begun to carve a path for storage to participate in their markets.

Moreover, approximately 37% of existing battery storage capacity in California was installed in response to a leak at the Aliso Canyon Natural Gas Storage Facility, which posed a risk of limited access to natural gas for power generation. In May 2016, to help address reliability risks due to constraints on the natural gas supply, CPUC authorized local power utilities, including SDG&E, to

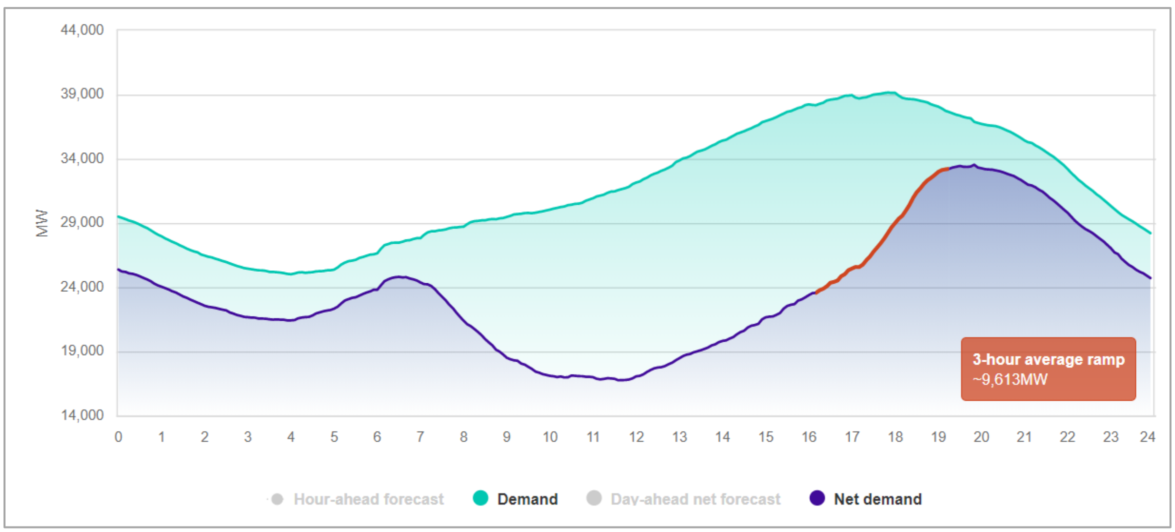
[20] Source: Source: EIA.

hold an expedited solicitation for energy storage. By early 2017, 38 MW of battery storage were installed for the SDG&E service area.[21]

B. Project Impacts

Battery storage systems can reduce the use of regulation-up and regulation-down fossil-fuel power plants that are needed because of constant changes in energy supply and demand. Consequently, battery storage systems are often designed to optimize the delivery of power to the grid and improve its efficiency. The transition to a low-carbon, and eventually zero-carbon, grid provides challenges and opportunities, as the State of California incorporates more renewable energy into its power grid. CAISO, the electric system operator for most of California, is responsible for ensuring service reliability and optimizing supply and demand bids for wholesale electric power. For a grid to be stable, power supply should always exceed demand by a small percentage, but the greater the difference between supply and demand, the greater the cost-inefficiency of the grid. Figures 5 and 6 illustrate how CAISO meets demand while managing the quickly changing ramp rates of variable energy resources, such as solar and wind.

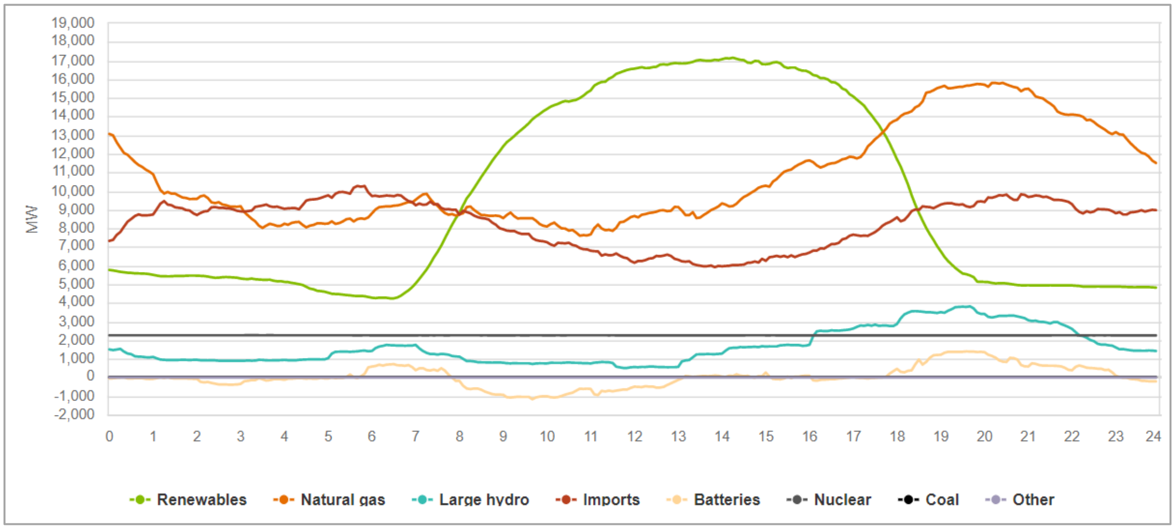
Figure 5
NET DEMAND OF CAISO



Net demand is total demand less electricity produced by solar and wind.
Source: California ISO for August 17, 2021.

[21] Ibid.

Figure 6
SUPPLY MIX OF CAISO



Source: California ISO for August 17, 2021.

As shown in Figure 6, as solar generation increases when the sun is shining, supply from natural gas-fired plants decreases. This trend is reversed late in the afternoon when natural gas power generators are dispatched to satisfy a considerable portion of the electricity demanded, while at the same time solar generation decreases.

Given the intermittent nature of renewable energy sources and the response times of conventional generation sources, supply always exceeds demand. Table 8 shows CAISO supply and demand at different times of the day.

Table 8
CAISO DEMAND AND SUPPLY

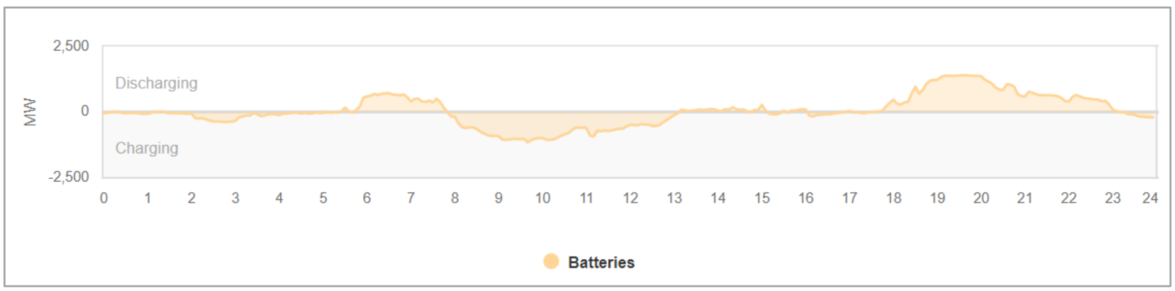
Time	Supply (MW)	Demand (MW)	Difference (MW)
02:00	26,917	26,466	451
06:00	27,108	26,644	464
10:00	31,797	30,041	1,756
14:00	35,993	35,419	574
18:00	39,735	39,136	599
22:00	33,623	33,197	426

Source: California ISO for August 17, 2021.

By increasing installed capacity of electricity storage systems, CAISO will be able to manage the grid more efficiently and more closely match power demand, while reducing the need to ramp fossil-fuel power plants up or down. The anticipated environmental outcomes from the installation of a 132 MW_{AC} battery storage system with the capacity to store up to 264 MWh of electricity per cycle or 87,650 MWh per year include the displacement of approximately 31,100 metric tons/year of CO_2.[22]

The charge/discharge capacity of energy storage also increases the capacity factor of existing resources. Battery storage helps smooth out the delivery of variable or intermittent resources such as wind and solar, by storing excess energy and delivering it when demand increases. As the energy supply mix becomes cleaner with low- and no-carbon resources, energy storage will help that supply mix evolve more easily and reliably. Figure 7 shows the trend of batteries usage in CAISO, where batteries are usually charged during the day when solar energy is available and are discharged in the early morning and evening when energy demand increases in a short period of time (ramp up).

Figure 7
CAISO BATTERIES TREND



Source: California ISO for August 17, 2021.

Energy storage also supports the development of a more resilient grid by increasing the reliability and security of the energy supply for end users. Additional benefits of battery storage systems are outlined below:

- Combining a renewable energy generator with an energy storage system provides constant power output over a certain period.
- Load management provides power reliability and maximizes renewable power consumption.
- Storing excess wind and solar power reduces the potential curtailment of energy output from a non-dispatchable generator (e.g., wind or solar) in order to comply with local grid codes related to grid stability or to prevent overproduction or overproduction penalties.

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[22] CO_2 calculations are based on the potential emissions avoided as a result of: (i) charging and discharging 52,650 megawatt-hour (MWh)/year of electricity for frequency control purposes, which would otherwise be supplied by natural gas-fired power plants, and on the emission factor for natural gas plants in the state of California, calculated by NADB based on information reported by EIA and the California Energy Commission; and (ii) charging and discharging 35,000 MWh/year of electricity from the sale of energy based on the California energy matrix. The CO_2 emission factor for frequency regulation is 0.456 metric tons/MWh. The CO_2 emission factor for energy sales is 0.202 metric tons/MWh. Although reductions in the emission of sulfur dioxide (SO_2) and nitrogen oxides (NOx) are also expected, emission factors related to the production of electricity generated by natural gas plants and by the California energy matrix were negligible.

- Frequency regulation helps balance temporary differences between supply and demand, often in response to deviations in the interconnection frequency.
- Voltage support ensures the quality of the power delivered by maintaining the local voltage within specified limits.
- Storing and delivering power compensates for variations in grid demand.
- Arbitrage occurs when batteries charge with inexpensive electrical energy and discharge when prices for electricity are high, also referred to as electrical energy time-shift.
- Backup power, following a failure of the grid, provides an active reserve of power and energy that can be used to energize transmission and distribution lines, provide start-up power for generators or provide a reference frequency.
- Transmission and distribution deferral keeps the loading of transmission or distribution system equipment lower than a specified maximum, which allows for delays or completely avoids the need to upgrade a transmission system or avoids congestion-related costs and charges.

C. Transboundary Impacts

No transboundary impacts are anticipated as a result of Project implementation.

3.2.2. Compliance with Applicable Environmental Laws and Regulations

A. Environmental Clearance

Project construction will require certain permits from local authorities. In six of the eight project sites, either a Conditional Use Permit or a Minor User Permit will be required to authorize the land use for the installation and operation of the energy storage facilities. Since the granting of these permits is discretionary, the projects must comply with the California Environmental Quality Act (CEQA). In the case of the other two project sites, local authorities have determined that the permits required for construction and operation of the systems are ministerial and, therefore, are exempt from CEQA.

Of the six projects not exempt from CEQA, the Sponsor expects that the corresponding lead agencies will determine that each system is Categorically Exempt, based on their size, location and the fact that no environmental adverse effects are expected as a result of their implementation. Nevertheless, if any of the lead agencies determines that any of the projects is not Categorically Exempt, the Sponsor will have to prepare and submit an Initial Study. Such study will have to identify, if any, potential significant effects on the environment due to the implementation of a particular project.

Table 9 presents the required land use permits and the expected CEQA determination for each Project site.

Table 9
PROJECT LAND USE PERMITS AND EXPECTED CEQA DETERMINATION

Site	Land Use Permits	CEQA Determination
Chula Vista	None	Exempt
Murray	None	Exempt
Mesa Heights	Conditional use	Categorically exempt (expected)
Imperial Beach	Conditional use	Categorically exempt (expected)
Rancho Bernardo	Minor use	Categorically exempt (expected)
Spring Valley	Minor use	Categorically exempt (expected)
Chicarita	Conditional use	Categorically exempt (expected)
Border	Conditional use	Categorically exempt (expected)

B. Mitigation Measures

Although no environmental clearance is expected for any of the projects, the Sponsor is planning to take the following actions regarding the implementation of the Project.

- Waste. Any waste generated during the construction and operational phases of the Project will be disposed off in accordance with applicable regulations.
- *Hazardous Materials*. The Project will utilize lithium-ion technology. Once the batteries reach the end of their useful life, they will be recycled.
- *Noise*. The Sponsor will comply with construction schedules set by local authorities to prevent noise generation outside of allowable days and hours.

C. Pending Environmental Tasks and Authorizations

Conditional Use Permits for four of the sites and Minor Use Permits for two of the sites are still pending. The respective lead agencies will have to evaluate and determine whether the systems located at these six sites are Categorically Exempt from CEQA. In the latter case, no environmental authorizations for the Project will be required.

Regardless of the determination by the lead agencies regarding CEQA exemption, construction at each Project site will only commence once all required permits have been obtained.

3.3. Financial Criteria

The Project Sponsor has requested a loan from the North American Development Bank (NADB) to complete the financing of the Project. The financing will be structured as a portfolio loan with 44 projects that will provide revenue streams for the repayment of the loan, all located within the jurisdiction of NADB. This payment mechanism is consistent with similar projects in the U.S. market. The source of payment will be the revenue generated by the sale of diverse services and products generated by the Project in the spot market. NADB will have no recourse beyond the Borrower company.

NADB performed a financial analysis of the sources of payment, the proposed payment structure and the projected cash flows over the term of the loan. These cashflows are estimated to be sufficient to a) cover scheduled operation and maintenance (O&M) expenses, b) fund any debt service reserve or cover the costs of a debt reserve letter of credit and c) pay the debt service on the senior loan. The loan will also be sized to comply with the required debt service coverage ratios.

In addition, NADB will verify that the Borrower has the legal authority to contract financing and pledge its revenue for the payment of financial obligations. Moreover, NADB will make sure that the Borrower has the legal and financial capacity to operate and maintain the Portfolio properly. NADB has verified that the projected O&M costs are in accordance with industry standards.

Considering the Project's characteristics and based on the financial and risk analyses performed, the proposed Project is considered financially feasible and presents an acceptable level of risk. Therefore, NADB proposes providing a market-rate loan for up to US$70 million for the construction of the Project.

4. PUBLIC ACCESS TO INFORMATION

4.1. Public Consultation

NADB published the draft certification and financing proposal for a 30-day public comment period beginning on September 7, 2021.

4.2. Outreach Activities

NADB conducted a media search to identify potential public opinion about the Project. No specific articles or references to the Project were found. No public opposition to the Project has been identified.