Q. MINERAL AND ENERGY RESOURCES

This section evaluates the Proposed Project’s effects on mineral and energy resources. Impacts related to electricity and natural gas infrastructure are discussed in Section IV.K, Utilities and Service Systems. The relationship between energy consumption and greenhouse gas emissions is discussed in Section IV.G, Air Quality.

Q.1 MINERAL RESOURCES

SETTING

All land in the City and County of San Francisco, including the Project Area, is designated Mineral Resource Zone 4 (“MRZ-4”) by the California Division of Mines and Geology under the Surface Mining and Reclamation Act of 1975. This designation indicates that there is inadequate information available about the land for it to be assigned to another MRZ; thus, the area is not a designated area of significant mineral deposits. No locally important mineral resources are identified in the Project Area in the San Francisco General Plan.

Regulatory Framework

There are no regulations related to mineral resources applicable to the Project Area.

IMPACTS

Significance Criteria

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to mineral resources. The Planning Department’s Initial Study Checklist provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have a significant impact related to mineral resources if it were to:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State; or
- Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

1 California Division of Mines and Geology, Open File Report 96-03, 1996 and Special Report 146 Parts I and II, 1986. Copies of these reports are available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.
Project Impacts

Treasure Island and Yerba Buena Island ("the Islands") are already developed with existing institutional and residential buildings. There are no known mineral resources in the Development Plan Area. Development of the Proposed Project would not impact future evaluation of known mineral resources or designation of the site. Additionally, there are no designated mineral resource recovery sites in the Development Plan Area whose operations or accessibility would be affected by the construction or operation of the Proposed Project. Therefore, the Proposed Project would have no impact on known mineral resources or any locally-important mineral resources recovery site.

Q.2 ENERGY RESOURCES

SETTING

Existing Electrical Demand

Energy demand is measured by power flow, expressed in kilowatt-hours (kWh) on a residential utility bill and in megawatt-hours (i.e., million Watt hours, abbreviated MWh) when describing large-scale use, such as a city. Peak demand in California occurs on hot summer days when the cooling load is greatest; however, in the cool San Francisco Bay climate, peak demand may occur on a cold winter evening when the heating load is greatest (where electric heat is used). Peak demand is measured in capacity, expressed in megawatts (MW).

Recent data available from the California Energy Commission ("CEC") indicate that California’s per capita electricity use is the lowest of any state.\(^2\) In 2005, the per capita usage was about 12,000 kWh per person nationwide, while California’s usage per person was about 7,000 kWh. National consumption for the U.S. was about 3,661 million MWh annually, and for California, about 254 million MWh annually.

The estimated existing peak electrical-capacity demand for Treasure Island and Yerba Buena Island is approximately 3.1 MW.\(^3\) This figure includes the existing residential and commercial

\(^3\) Treasure Island Infrastructure Plan Update, Chapter 11, Addendum, August 18, 2009 (hereinafter referred to as Infrastructure Update), Section II.1.1. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E. This value is based on recorded meter data for the period November 2004 to October 2005.
uses, wastewater treatment plant, Job Corps, and Coast Guard. The existing electric energy demand is roughly 15,000 MWh per year.4

Existing Electrical Supply

According to CEC data, 73 percent of California’s electricity supply is generated in-state, while about 8 percent comes from the Northwest and 18 percent from the Southwest. 5 In 2008, the primary resources used to generate California’s electricity were approximately 46 percent natural gas, 16 percent coal, 15 percent nuclear, 10 percent large hydroelectric, and 14 percent renewables (wind, solar, etc.).6

San Francisco receives the majority (over 75 percent) of its electricity from Pacific Gas and Electric Company ("PG&E"). PG&E’s resource mix is approximately 42 percent natural gas, 23 percent nuclear, 19 percent large hydroelectric, 13 percent renewables, and 3 percent coal.7 In 2008, PG&E’s renewable energy (13 percent) consisted of about 5 percent biomass, 4 percent small hydroelectric, 2 percent geothermal, 2 percent wind, and close to 0 percent solar.8

The remainder of San Francisco’s electricity is provided by the San Francisco Public Utilities Commission ("SFPUC") and other local generators. The SFPUC generates hydroelectric power at the Hetch Hetchy Water and Power project in and near Yosemite National Park, and at other locations in the Sierras. The SFPUC has three hydroelectric projects, capable of producing about 400 MW of electricity during the spring run-off period, when the associated water reservoirs are full.9 During an average year, the hydroelectric plants are capable of producing 1.7 million MWh.10 The SFPUC also purchases power.

The SFPUC provides electricity to the Islands. Within the SFPUC, the Power Enterprise focuses on providing adequate and reliable supplies of electric power to meet the municipal requirements

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4 TICD, A Sustainable Future for Treasure Island, October 2006 (hereinafter referred to as Treasure Island Sustainability Plan), p. 44. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E. This rough number is from a figure, “Energy Consumption (by Phase),” and was derived from an SFPUC metered data set for 1996-2006, using the final two years of the sequence.


6 California’s Major Sources of Energy.


10 ERP, p. 22.
of the City and County of San Francisco and the non-municipal requirements of Hunters Point Shipyard and Treasure Island/Yerba Buena Island. The Redevelopment Project group within the Power Enterprise manages short-term utility services and long-term development of infrastructure improvements at Treasure Island and Yerba Buena Island.

Existing Natural Gas Demand

Natural gas is measured in cubic feet of gas, or by its heat content in British Thermal Units (Btu) or therms. According to CEC data, in 2006, California consumed about 6,032 million cubic feet of natural gas per day. Total residential consumption was about 6,700 million therms in 2007, and average gas consumption per household was about 538 therms.

The existing natural gas demand at the Islands, including the Job Corps campus and the Coast Guard, is roughly 1.5 million therms per year.

Existing Natural Gas Supply

According to the CEC, in 2007 13 percent of California’s natural gas needs were supplied by in-State sources, while about 41 percent came from the Southwest, 24 percent from the Rocky Mountain area, and 22 percent from Canada. PG&E provides natural gas to San Francisco and the Islands.

Because of its low density, natural gas is difficult to store. After extraction from the earth, natural gas is transported over long distances by pipeline from sources to demand centers. Only a relatively small portion is stored in facilities or underground. Gas is typically supplied on-demand and California’s reliance on imported natural gas leaves the state vulnerable to price shocks and supply disruptions.

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13 A British Thermal Unit is the amount of heat needed to raise the temperature of one pound of water (approximately 8.3 gallons) one degree Fahrenheit. A therm is a unit of measurement for natural gas, equivalent to 100,000 Btu’s.
15 Treasure Island Sustainability Plan, p. 45. This rough number is from a figure, “Natural Gas (Consumption by Phase),” and was derived from a SFPUC metered data set for 1996-2006, using 2004-2006 data.
16 California’s Major Sources of Energy.
17 Liquefying natural gas by greatly reducing its temperature greatly reduces the storage volume needed, but this process is expensive.
Regulatory Framework


Federal, State, and local laws, regulations, policies govern and influence supply and demand for energy, as described below.

Federal

The Energy Independence and Security Act of 2007 is the latest major, comprehensive, energy legislation at the Federal level. It includes a renewable fuel standard (Section 202), appliance and lighting efficiency standards (Sections 301-325), and building energy efficiency standards (Sections 411-441).

The American Recovery and Reinvestment Act of 2009 (H.R. 1, also known as the “Stimulus Bill”) included a number of provisions to encourage the development and financing of renewable energy, from demonstration project funding to loan guarantees.

State

The California Code of Regulations, Title 24, parts 1 and 6 (referred to below as “Title 24”) regulates energy efficiency in buildings. Title 24 provides construction standards for heating, cooling, ventilation, water heating, and lighting.¹⁸ The CEC regulates appliance efficiency and has adopted progressively more stringent regulations over the years, most recently in 2009.¹⁹

In July 2008, the California Building Standards Commission adopted voluntary green building standards that will become mandatory in the 2010 California Building Code, which will become effective January 1, 2011.²⁰ The California Green Building Standards Code establishes standards including planning and design for sustainable site development, energy efficiency in excess of the

California Energy Code requirements, and other matters. The Green Building Standards Code allows local jurisdictions that had already adopted green building standards to retain them if they are as, or more, stringent than the provisions in the state code.

California has a Renewable Portfolio Standard (“RPS”) that requires retail sellers of electricity to procure 20 percent of their resources from renewable sources by the year 2010.21 In addition, sellers must increase their percentage of renewable power by 1 percent per year. The law applies to both investor-owned and publicly owned utilities. Thus far, utilities in the State are not on track to achieve the 20 percent goal in 2010, but, will generally fall several percentage points short. The California Public Utilities Commission (“CPUC”) expects the investor-owned utilities will achieve the 20 percent renewable target by 2013 or 2014.22 For example, in 2008, PG&E served 11.9 percent of its retail electricity sales with renewable power.23 SFPUC obtains a majority of its electricity from Hetch Hetchy hydroelectric sources, which are renewable resources (although only hydroelectric facilities smaller than 30 MW are included within the Renewable Portfolio Standard's definition of “renewable”24).

Governor Schwarzenegger signed Executive Order S-14-08 on November 17, 2008, which raises California’s RPS to 33 percent by the year 2020.25 The Governor’s Executive Order S-21-09, signed September 15, 2009, requires the California Air Resources Board to establish regulations by July 2010 towards achieving the 33 percent goal.26

The CPUC regulates investor-owned utilities operating in California, including Pacific Gas & Electric Company. The CPUC has required utilities to conduct energy efficiency (or “demand-side management”) programs for many years, including, for example, subsidies for installing weatherization in residential buildings. The CPUC also has extensive programs to implement the RPS and otherwise encourage renewable energy.

21 The RPS was established by Senate Bill 1078 in 2002, and Senate Bill 107 in 2006 moved the original 2017 deadline to 2010.
Local

San Francisco General Plan

The Environmental Protection Element\textsuperscript{27} of the \textit{San Francisco General Plan} contains a section on energy. The following objectives and policies are relevant to the Proposed Project:

Environmental Protection Element

Objective 12: Establish the City and County of San Francisco as a Model for Energy Management.

Policy 12.1: Incorporate energy management practices into building, facility, and fleet maintenance and operations.

Policy 12.3: Investigate and implement techniques to reduce municipal energy requirements.

Policy 12.4: Encourage investment in capital projects that will increase municipal energy production in an environmentally responsible manner.

Policy 12.5: Include energy emergency preparedness plans in municipal operations.

Objective 13: Enhance the Energy Efficiency of Housing in San Francisco.

Policy 13.2: Strengthen enforcement of the state’s residential energy conservation building standards.

Policy 13.3: Expand the environmental review process to encourage the use of additional measures to save energy in new housing.

Policy 13.4: Encourage the use of energy conserving appliances and lighting systems.


Policy 14.2: Insure adequate local enforcement of California’s non-residential building standards.

Policy 14.3: Commercial case studies and energy research efforts should be undertaken to determine cost-effective energy conservation strategies, e.g. single metering, integrated energy systems, flextime to reduce peak transit use, that should be integrated into EIR procedures.

Policy 14.4: Promote commercial office building design appropriate for local climate conditions.

Policy 14.5: Encourage use of integrated energy systems.

Objective 15: Increase the Energy Efficiency of Transportation and Encourage Land Use Patterns and Methods of Transportation Which Use Less Energy.

Policy 15.1: Increase the use of transportation alternatives to the automobile.

Policy 15.3: Encourage an urban design pattern that will minimize travel requirements among working, shopping, recreation, school and childcare areas.

Policy 15.5: Encourage consideration of energy use issues when making transportation investment decisions.

Objective 16: Promote the Use of Renewable Energy Sources.

Policy 16.1: Develop land use policies that will encourage the use of renewable energy sources.
IV. Environmental Setting and Impacts
Q. Mineral and Energy Resources

The Housing Element of the *San Francisco General Plan* provides the following objective and policy:

**Objective 11:** In Increasing the Supply of Housing, Pursue Place Making and Neighborhood Building Principles and Practices to Maintain San Francisco’s Desirable Urban Fabric and Enhance Livability in All Neighborhoods.

**Policy 11.10:** Include energy efficient features in new residential development and encourage weatherization in existing housing to reduce overall housing costs and the long-range cost of maintenance.

*Other San Francisco Plans and Policies*

The City has several other plans that aim to reduce energy use and/or encourage renewable sources of energy. The City developed a Sustainability Plan\(^28\) as official policy in 1997, but the Board of Supervisors has not yet committed the City to perform all of the actions addressed in the plan. The Sustainability Plan provides general policy direction towards achieving energy efficiency, greater use of renewables, and reducing pollution (see discussion in Chapter III, Plans and Policies).

In 2002, San Francisco adopted an Electricity Resource Plan that focused on replacement of old power plants in the southeast portion of the City.\(^29\) The plan focuses on reliable, affordable, and renewable sources of energy for the future of San Francisco. A subsequent study, published in 2003, *An Energy Resource Investment Strategy*, further analyzed the City’s energy situation, and described actions to take for energy efficiency and renewable energy.\(^30\) San Francisco subsequently adopted a *Climate Action Plan* (2004) committing the City to reducing greenhouse gas emissions by 20 percent below 1990 levels by 2012.

In 2004, the City amended Chapter 7 of the Environment Code, requiring all new municipal construction and major renovation projects to achieve Leadership in Energy and Environmental Design (“LEED”\(^28\)) Silver Certification. According to the U.S. Green Building Council, which developed LEED, LEED provides building owners and operators with a framework for identifying and implementing green building design, construction, operations and maintenance.

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\(^29\) *ERP*, pp. 1-6.

LEED uses colors to designate increasing energy efficiency, from “Certified” to “Silver” to “Gold” to “Platinum.”

In 2008, San Francisco adopted a Green Building Ordinance that increases the stringency of energy saving requirements for new construction of residential and commercial buildings and renovations to existing buildings. The Green Building Ordinance requires an unprecedented level of LEED and green building certifications, which makes San Francisco’s ordinance one of the most stringent green building requirements in the nation. Under the ordinance, by 2012, new commercial buildings over 25,000 sq. ft. must meet LEED Gold requirements. Residential buildings taller than 75 feet must meet LEED Silver, and smaller residential structures must earn 75 points on the GreenPoints checklist. GreenPoints refers to a residential green building system and checklist and certification methodology of the non-profit organization Build It Green.

**IMPACTS**

**Significance Criteria**

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to energy resources. The Planning Department’s Initial Study Checklist Form provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have a potentially significant impact related to energy resources if it were to:

- Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner.

**Approach to Analysis**

A number of factors may be considered in determining whether a project would use a large amount of energy or whether the use of energy would be wasteful, such as: 1) the degree to which energy conservation measures would be applied, 2) use of on-site renewable energy, and 3) conformance with policies geared to energy efficiency.

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33 San Francisco Green Building Requirements, section 1302C.
34 State CEQA Guidelines, Appendix F, “Energy Conservation,” provides a list of optional factors that an EIR may consider in analyzing the energy implications of a project.
For the Proposed Project, electrical and natural gas demand estimates were created using an energy modeling software program called eQUEST,\textsuperscript{35} as further described below under “Proposed Project’s Electricity and Natural Gas Demand.”

**Treasure Island Sustainability Plan**

The *Sustainability Plan* for Treasure Island sets forth the project sponsors’ initial sustainable development ideas and commitments. The *Sustainability Plan* aims to reduce energy demand and promote renewable energy as follows:\textsuperscript{36}

- **Goal:** Reduce energy demand, create sustainable supply, and achieve carbon neutrality.
  - Strategy E1. Minimize peak energy demand and reduce overall energy consumption of buildings and infrastructure.
  - Strategy E2. Centralize heating and cooling where appropriate to maximize efficiency and reliability.
  - Strategy E3. Maximize the percentage of on-island power generation from renewable sources.
  - Strategy E4. Encourage and utilize renewable power generation from off-site sources.
  - Strategy E5. Provide adequate supplemental on-island power generation capacity or an alternative supply to support operation of the island following loss of supply.

**Proposed Project Facilities**

The following discussion is based on preliminary concepts for the Proposed Project’s electricity, natural gas and renewable energy systems.\textsuperscript{37} Most of the electric power that would be used on the Islands would continue to be generated off site. This power would continue to be transmitted to the Islands, and distributed by, a local utility provider. In addition, TIDA would direct the provision of on-site renewable energy. All heating and cooling would provided at the individual building level and independent from the adjacent buildings (see Chapter VI, Project Variants, Variants A.2 and A.3, for a discussion of possible district heating and cooling variants under consideration). The Proposed Project would meet Title 24 energy conservation measures, and meet or exceed the standards in San Francisco’s Green Building Ordinance.

\textsuperscript{35} Arup North America Ltd., *Treasure Island Development Energy Study*, prepared for TICD, December 2009, p. 9 (hereinafter referred to as *2009 Energy Study*). A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

\textsuperscript{36} *Treasure Island Sustainability Plan*, p. 39.

\textsuperscript{37} As discussed in Chapter II, Project Description, master utility plans for the electrical and gas system service will be prepared in coordination with the SFPUC. These plans will include detailed layouts and design requirements for the on- and off-site upgrades and repairs, coordination with utilities providers, and phasing plans for the new systems.
Renewable Energy

The Infrastructure Plan includes a renewable energy component involving photovoltaic solar power and possibly small, vertical-axis wind turbines. The project sponsors have committed to meeting 5 percent of peak electric demand with on-site renewable sources, such as (but not limited to) solar photovoltaic. This target would be achieved by designing building rooftops to accommodate photovoltaic systems, and potentially using solar water heating and demonstration-level wind energy production. No particular target has been established for renewable energy to take the place of natural gas use, but if technologies such as solar hot water would be used, then some displacement of natural gas use for heating would occur.

The draft Design for Development would permit development of either ground-mounted or roof-mounted photovoltaic systems. With current technology, about 1.4 to 3 acres of photovoltaic panels (either ground or roof-mounted) would be required to meet the goal of 5 percent of the peak power demand. The draft Design for Development would permit roof-mounted photovoltaic systems on all buildings, including on historic Buildings 1, 2, and 3.

Two photovoltaic (PV) technologies would likely be used at Treasure Island: crystalline silicon (c-Si) PV and thin-film PV. The technology is manufactured in arrays of cells containing the material that converts solar radiation into direct current electricity. The material is typically encased in glass, but new technologies are being developed that would include solar PV systems as part of a building’s outer covering. The direct current PV output would be converted to alternating current for input to the electric grid.

Roof-mounted photovoltaic systems typically look like large, dark, glass panels. On a flat roof, the panels may be set up at an angle to better catch the sun’s rays. Panels in ground-mounted PV systems may lie flat on the ground, be set up at an angle, or have other configurations. For example, the panels may be attached to poles that turn to track the sun during the day.

The types of wind power systems are not known. Changes in technology are expected over the next few years that make it difficult to accurately predict the precise nature of the equipment likely to be used. Therefore, wind energy production facilities and locations are expected to be selected at some time in the future and would undergo appropriate environmental review at that time.

38 Infrastructure Update.
39 Based on information from Arup, the Project Sponsors’ energy consultant.
40 The peak photovoltaic output would not coincide with the Proposed Project’s peak demand. The photovoltaic peak output would occur around 1 p.m. on a July day. The Proposed Project’s peak electric demand would likely occur around 6 p.m. on a September day. 2009 Energy Study, p. 4.
**Energy Conservation**

The Proposed Project would meet Title 24 energy conservation measures, meet the standards of San Francisco’s Green Building Ordinance, and could include additional energy conservation measures such as those listed below:42

- Insulation at higher levels than required;
- High-performance windows (glazing), such as additional panes of glass, low emissivity coating on one of the glass panes, or a reflective or tinted coating;
- External shading of a building;
- Daylighting (allowing natural light into a building to reduce lighting needs), including skylights;
- Thermal mass (typically meaning interiors with exposed concrete with no painting or other finishes);
- Occupancy sensors to turn off lights when rooms are unoccupied;
- High efficiency lighting (such as compact fluorescent bulbs or LEDs);
- Natural ventilation;
- Natural ventilation with baseboard heating (where heat is distributed via water to radiator type emitters that sit below windows at exterior walls);
- Split system air conditioning for residential units, having high cooling efficiency;
- Split system heating systems;
- Heat pump cooling systems;
- Radiant heating and cooling (meaning running hot or chilled water through tubes embedded in the floor);
- Underfloor air distribution (putting air into rooms at low elevations rather than high elevations under more pressure);
- Demand control ventilation (sensing the level of carbon dioxide to reduce unnecessary ventilation);
- Waterside economizer (an extra hydronic circuit to allow a building’s heat rejection system to bypass the chiller, reducing chiller use);
- Indirect evaporative cooling;
- Heat recovery systems;
- High efficiency chillers and boilers;
- Variable speed drives on motors;
- Energy Star-compliant equipment (including appliances); and
- Solar hot water systems.

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The next subsection explains the net energy reduction associated with using the measures and provides further details on meeting San Francisco’s energy conservation requirements.

**Proposed Project’s Electricity and Natural Gas Demand**

The *Treasure Island Development Energy Study* discussed below estimates the likely peak and annual energy demand for the Proposed Project using reasonable assumptions of what would be expected to be built given regulatory requirements, the Treasure Island Green Building Specifications, and typical construction practices in the Bay Area. Based on these estimates, the Proposed Project’s electrical peak demand is estimated at 11.4 MW and annual electrical energy consumption at 58,500 MWh. The Proposed Project’s peak natural gas demand is estimated at 42.6 million British Thermal Units per hour (Btu/hr) and annual gas consumption at 980,000 therms per year. Total annual, operational, energy consumption would be 297,500 million Btu/yr. These estimates assume various strategies for energy demand reduction using reasonable assumptions of what would be expected to be built, given regulatory requirements, Treasure Island Green Building Specifications, and typical construction practices in the Bay Area.

These estimates assume that four levels of energy demand reduction are implemented:

- Implementing the energy conservation measures required by Title 24,
- Meeting the San Francisco Green Building Ordinance or LEED-New Construction Gold energy performance equivalent,
- Adding energy conservation measures in accordance with the Treasure Island Green Building Specifications,
- Assuming no space cooling would be provided for low-rise and medium-rise residential buildings and assuming gas-fired baseboard heating (rather than heat pumps) would be used for these residential buildings.

These estimates are for full build-out and include the infrastructure that would be installed (e.g., new or upgraded wastewater treatment plant) as well as the existing uses that would remain.

The following text explores the assumptions underlying these estimates. The project sponsors’ engineering consultant, Arup North America Ltd. (“Arup”), developed the estimates for building energy consumption using an energy modeling software program called eQUEST. The engineers created computer models of seven different generic building types, and made assumptions regarding their energy efficiency.

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Level 1, the base case, assumes compliance with Title 24 energy efficiency standards in effect in 2008 (as would be required for new buildings permitted in 2010).\textsuperscript{47} Under the base case, electrical peak demand would be 18.3 MW, annual electrical energy demand 78,000 MWh, and total annual energy consumption, 350,000 million Btu/yr.\textsuperscript{48} To help set clear targets for building energy conservation that would exceed State and local energy regulations, Arup performed calculations for three increasingly stringent levels of energy conservation measures.\textsuperscript{49}

Level 2 applies San Francisco’s Green Building Ordinance or the Treasure Island Green Building Standards, and assumes that commercial and residential buildings would meet an equivalent to LEED New Construction Gold certification.\textsuperscript{50} Under the ordinance, by 2012, new commercial buildings over 25,000 sq. ft. must meet LEED Gold requirements. Residential buildings taller than 75 feet must meet LEED Silver, and smaller residential structures must earn 75 points on the Greenpoints checklist.\textsuperscript{51} Implementing these energy performance measures would result in approximately 9 percent less energy use than when simply complying with Title 24.

Level 3 improves upon Level 2 by applying a series of additional energy conservation measures that would be consistent with the Treasure Island Green Building Specifications, and which are described above. Level 3 would reduce overall energy consumption by another 6 percent over Level 2 (i.e., approximately 15 percent less energy use than when simply complying with Title 24).\textsuperscript{52}

Level 4 incorporates the climatic conditions at the Islands into the Level 3 assumptions. Cooling is typically not necessary in low- to medium-sized buildings near the San Francisco Bay because there are few really hot days, and internal building loads (e.g., from lighting) are not that great in smaller buildings. Level 4 assumes that no cooling equipment for new low- to medium-sized residential buildings would be provided. Further, Arup assumed gas-fired baseboard heating for these residential buildings, rather than its base-case assumption of electrical heat pumps.\textsuperscript{53}

Implementation of Level 4 would result in considerable energy conservation beyond that required by California Title 24 standards. Electricity peak demand for the Proposed Project under Level 4 would be 38 percent less than the base case; electricity energy consumption would be 25 percent

\textsuperscript{47} 2009 Energy Study, pp. 10-11.
\textsuperscript{49} 2009 Energy Study, pp. 2-3.
\textsuperscript{50} 2009 Energy Study, p. 11. “LEED NC is green building standards for new construction and major renovation.
\textsuperscript{51} 2009 Energy Study.
\textsuperscript{52} 2009 Energy Study, p. 4, Table 3.
\textsuperscript{53} 2009 Energy Study, p. 3.
less, and overall energy consumption would be 15 percent less than the base case.\textsuperscript{54} Level 4 is the scenario recommended by Arup for the Proposed Project.

**Project Impacts**

**Construction**

**Impact ME-1:** Construction activities associated with the Proposed Project would not result in the use of large amounts of energy, or use energy in a wasteful manner. \textit{(Less than Significant)}

Construction activities would require electricity to operate air compressors, hand tools, mobile project offices, and lighting. Construction vehicles and equipment would primarily use diesel fuel, and construction workers would use gasoline and diesel to commute. The construction activities would not be expected to result in demand for electricity or fuels greater than that for any other similarly-sized project in the region. Although the Proposed Project would be large, it would be constructed over a period of approximately 20 years, and demand for electricity and fuels would be spread out over these years. Given these considerations, the construction-related energy use associated with the Proposed Project would not be large or wasteful and would be less than significant. Therefore, no mitigation is required.

**Operation**

**Impact ME-2:** During operation, the Proposed Project would not result in the use of large amounts of energy, or use energy in a wasteful manner. \textit{(Less than Significant)}

The Proposed Project’s energy demand would not be expected to result in demand for electricity or natural gas greater than that for any other similarly sized project in the region. It would include energy efficiency measures beyond current requirements. As explained above, the Proposed Project would comply with Title 24 and meet or exceed the energy conservation requirements of San Francisco’s Green Building Ordinance. The Proposed Project would also go beyond these two requirements by incorporating additional energy conservation measures through project-specific Green Building Specifications. Additional information is in the Sustainability Plan described above and summarized in Chapter II, Project Description. The proposed level of energy efficiency would ensure that the Proposed Project would not use energy in a wasteful manner.

To provide perspective regarding the Proposed Project’s forecasted energy use; here are comparisons with demand within the PG&E service area. The Proposed Project’s peak electrical capacity demand would be 11.4 MW. PG&E’s forecasted peak coincident electrical demand for

\textsuperscript{54} 2009 Energy Study, p. 4.
2012 is 19,126 MW. The Proposed Project’s peak would be 0.006 percent of the 2012 forecasted peak capacity demand for PG&E’s service area.

The Proposed Project’s annual electrical energy consumption at buildout would be 58,500 MWh/yr. PG&E’s forecasted energy demand for 2012 is 90,789 Gigawatt-hours (GWh), equivalent to 90,789,000 MWh/yr. The Proposed Project’s energy would be 0.006 percent of the 2012 forecast for PG&E’s service area.

The Proposed Project’s annual natural gas consumption at build-out would be 98 million cu.ft./yr. PG&E’s natural gas demand for 2004 was 732,920 million cu. ft./yr. The Proposed Project’s natural gas demand would be 0.003 percent of the 2004 usage in PG&E’s service area.

The above comparisons show that the Proposed Project’s energy demands would be very small compared to overall demand in the PG&E service area. The Proposed Project would not be expected to have a substantial effect on local and regional energy supplies, nor on the ability to serve peak energy demands. Furthermore, the Proposed Project would include a number of aspects to reduce its energy demand and would use renewable energy to offset a portion of its energy consumption, as discussed below.

The Proposed Project would be consistent with the energy efficiency objectives and policies in the Environmental Protection Element of the General Plan discussed under “Regulatory Framework” above. The Proposed Project would incorporate energy efficiency measures in municipal facilities (Objective 12) and in housing (Objective 13). It would be consistent with Policy 11.10 of the Housing Element for energy efficiency in housing.

The Proposed Project would produce 5 percent of peak power demand from on-site renewable resources, potentially including photovoltaic power generation and other renewable energy

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57 Note that the comparisons above regarding electrical use are for the Proposed Project’s total demand, not the incremental increase over current demand from Treasure Island and Yerba Buena Island. Therefore, the comparisons are conservative.
58 980,000 therms/yr x approximately 100 cu.ft. gas/therm = 98,000,000 cu.ft./yr. = 98 million cu.ft./yr.
59 PG&E data for 2004: 2,008 million cu. ft. gas/day x 365 days/yr. = 732,920 million cu. ft./yr. A forecast for natural gas consumption was not available on the CEC web site.
technologies. This is consistent with Objective 16 of the *Environmental Protection Element* encouraging the use of renewable energy.

In addition, as discussed in Chapter II, Project Description, pp. II.77 – II.79, the Proposed Project is designed compactly and with transportation features that encourage energy efficiency. This is consistent with Objective 15 of the *Environmental Protection Element*.

The Proposed Project would encourage recycling of solid waste, and would be required to comply with City ordinances that mandate reducing solid waste, as described in Section IV.K.5, Solid Waste Disposal. Reducing solid waste saves energy in the off-hauling of the waste. Recycling may save energy because less “virgin” raw materials are needed to make new products.

The Proposed Project would incorporate wastewater recycling. This would reduce the demand for potable water. Reducing potable water demand would save energy used to transport and treat, fresh water delivered to Treasure Island and Yerba Buena Island.

For these reasons, the operation-related energy use of the Proposed Project would not result in the use of large amounts of energy, or use the energy in a wasteful manner, and is therefore considered a less than significant impact.

**Cumulative Impacts**

Based on the Proposed Project’s (1) incorporation of measures that go beyond compliance with State and local energy efficiency laws, (2) inclusion of on-site renewable energy, and (3) conformance with State and local energy goals and policies, the Proposed Project’s contribution to overall energy consumption in California would not be cumulatively considerable.