



ADMINISTRATIVE BULLETIN

NUMBER AB-112

DATE: Effective January 1, 2021

SUBJECT: Administration and General Design

TITLE: Implementation of All Electric New Construction Regulations

PURPOSE: The purpose of this Administrative Bulletin is to detail standards and procedures for the implementation of the all-electric new construction requirements of the San Francisco Building Code effective January 1, 2021.

REFERENCE: 2019 San Francisco Building Code; 2019 San Francisco Green Building Code; San Francisco Administrative Bulletin 005: Procedures for Approval of Local Equivalencies; 2019 California Building Standards Code; San Francisco Environment Code, Chapter 7.

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1) DISCUSSION

Approved construction documents and completed projects must conform to requirements established in the San Francisco Building Code. San Francisco Building Code 106A.1.17.1 requires applications for permit submitted after January 1, 2021 to construct new buildings to be designed and constructed such that all space-conditioning, water heating, cooking, and clothes drying systems are all-electric, as defined, and prohibits installation of infrastructure, piping systems, or piping for distribution of natural gas or propane to such uses.

APPLICABILITY

San Francisco Building Code Section 106A.1.17.1 applies to all permit applications for new construction submitted on or after January 1, 2021 proposing to construct one or more new buildings in San Francisco

In the case of Site Permits, the effective date is the date the Site Permit application (not an addendum) is filed with the Department of Building Inspection. Addenda to site permits and revisions to permit applications received on or after January 1, 2021 are not required to meet the requirements of San Francisco Building Code Section 106A.1.17.1, unless the addenda or revisions change the scope of the project such that current codes are generally applicable, or such that an exception granted on the basis of infeasibility is no longer warranted.

For projects which submit an initial application for permit after January 1, 2021 and before January 1, 2022, areas specifically designated for commercial food service may provide gas piping systems, fixtures, and infrastructure exclusively for cooking equipment within the area designated for commercial food service. However, such projects are by definition "mixed-fuel" and subject to applicable requirements (see Administrative Bulletin 93).

DEMONSTRATION OF COMPLIANCE

San Francisco Building Code Section 106A.1.17.1 is not an energy requirement; it is a provision enacted for protection of health and safety. For administrative efficiency, no special documentation is necessary for projects that comply with San Francisco Building Code Section 106A.1.17.1. Projects that do not seek an exception are to document compliance via normal documentation requirements and procedures, such as:

Piping Systems and Mechanical Systems

Project submittals providing any construction detail related to gas piping systems or mechanical system design must be consistent with all-electric design and construction, and not indicate the installation of gas piping systems, fixtures, or infrastructure. Documentation of compliance with California Title 24 Part 6 Energy Standards shall not include any indication of gas consumption for space conditioning, water heating, cooking, or clothes drying.

San Francisco Green Building Standards

Administrative Bulletin 93 (Implementation of Green Building Regulations) provides guidance for determining which provisions of relevant local ordinances and state building codes apply to a project, describes implementation procedures, and provides forms to document compliance. Per Administrative Bulletin 93, compliance with San Francisco Building Code Section 106A.1.17.1 (or Environment Code Section 706(d)(7) in the case of municipal buildings), shall be documented as required by Administrative Bulletin 93:

- Permit applications for new construction are not accepted without Green Building Site Permit Submittal GS-1.
- The submittal package for each addendum that includes architectural details must include a Green Building Submittal checklist incorporated into the project plans indicating the required measures and referencing location of such features in the construction documents and providing compliance details for each requirement. For newly constructed buildings, either GS-2, GS-3, or GS-6 is required with each addendum.

USES NOT SPECIFICALLY REGULATED

An All-Electric Building or Project as defined by San Francisco Building Code Section 202 is a building or project that relies on electricity as the source of energy for all space heating, space cooling, water heating, cooking, and clothes drying. Gas piping systems, fixtures, or infrastructure may be installed strictly to serve areas and systems outside the scope of this definition, such as industrial processes.

In projects that include uses not specifically addressed by this definition, all space heating, space cooling, water heating, cooking, and clothes drying systems must be designed and constructed as all-electric, and such a project is defined as "all-electric" for the purpose of compliance with San Francisco Green Building Code 4.201.1 and 5.201.1.2.

EXCEPTIONS

Compliance with San Francisco Building Code Section 106A.1.17.1 and all other requirements for new construction have been determined to be practical and feasible. An exception may be made only when an all-electric project is demonstrated to be physically or technically infeasible, and an exception shall only apply to the extent necessary to resolve the demonstrated infeasibility. The remainder of this bulletin describes the process for determination of infeasibility and grant of an exception allowing installation of natural gas piping systems, fixtures, or infrastructure.

2) CRITERIA FOR EXCEPTION ALLOWING A MIXED-FUEL SYSTEM OR AREA

San Francisco Building Code Section 106A.1.17.1 allows for approval of exception allowing gas infrastructure and piping systems to be installed on a case-by-case basis where All-Electric construction is demonstrated to be physically or technically infeasible. Physical or technical infeasibility is understood to refer to an exceptional situation where:

- A project proposal cannot be accomplished due to physical or technical constraints specific to site and occupancy that prohibit elements, spaces or features necessary for full and strict compliance with all requirements for new construction;

AND

- If a specific system or area is served by gas piping systems, fixtures, and infrastructure, then the physical or technical infeasibility is resolved, and the project is able to attain full and strict compliance with all requirements for new construction.

To qualify for such an exception, the project must:

1. Undergo a Third Party Review of All-Electric Feasibility, resulting in a determination by the reviewers that there is no means by which a proposed function or service may be provided by an all-electric design compliant with all applicable codes; and that the proposed function or service can feasibly be provided if gas piping systems, fixtures, and infrastructure are installed.
2. Limit installation of natural gas piping systems, fixtures, and infrastructure to the system or area for which All-Electric design is infeasible;
3. Ensure the area and system served by natural gas piping systems provides for future conversion to All-Electric, by complying with the applicable provisions of Electric Ready Design Guidelines (Attachment 2) to the maximum extent feasible.
4. Demonstrate that the project's modified design provides equivalent fire-protection and health and safety to All-Electric design.

Financial considerations are not a basis for determination of physical or technical infeasibility.

Criteria for determination of infeasibility:

Category	Criteria
A) Energy Standards	<p>Compliance with Title 24 Part 6 Energy Standards for all-electric design may be infeasible only if there is no prescriptive option for compliance with the Energy Standards, nor an option for compliance under the performance method for any system or technology serving the specific use.</p> <p>Proposal to install a technology, system, or design not allowed under the Energy Standards does not demonstrate infeasibility where all-electric technologies, systems, or designs are available for compliance with the Energy Standards.</p>
B) Electric Utility Infrastructure	<p>All-electric design may be infeasible if:</p> <ul style="list-style-type: none"> • Electric load calculations are prepared for both mixed-fuel design for a specific system or area, and all-electric design, with equivalent occupancies, functions, and floor area; and • The project submits an application for service to the electric utility serving the project; and • The utility determines that (a) the peak electric demand required for the all-electric design option cannot be served, and (b) the peak electric demand requested for the mixed-fuel design option can be served under substantially similar conditions. Substantially similar conditions shall include equivalent occupancies, functions, and floor area, as well as the same consideration of the time required for the utility to complete modifications to utility infrastructure, where necessary. <p>Under California Public Utilities Commission Rule 2.C, utilities are obligated to provide service. Request by the utility for the customer's proposal to comply with applicable tariff, easement, safety, and reliability requirements, or for reasonable time to construct improvements, is not a basis for infeasibility.</p>
C) Physical Constraint in Small Infill Sites	<p>All-electric design may be infeasible if:</p> <ul style="list-style-type: none"> • Electric load calculations are prepared for both a design including a specific mixed-fuel system and area, and all-electric design, with equivalent occupancies, functions, and floor area; and • Based on the rules published by the electric utility serving the site: <ul style="list-style-type: none"> ○ Peak electric demand for the mixed-fuel design does not require the installation of an electric service transformer; and ○ Peak electric demand for all-electric design with the same features requires the installation of an electric transformer; and • The site has a linear footage of street frontage of 75 feet or less;¹ and • Joint review by the Planning Department and Public Works Department determines there is no feasible option to locate an electrical transformer in the building or elsewhere on the property, and: <ul style="list-style-type: none"> ○ The only feasible option is to locate the transformer in a sub-surface vault in the public Right of Way; or ○ The sidewalk at the site is less than 10 feet in width, such that a sub-surface vault in the public Right of Way infeasible.
D) Exceptional Circumstance	<p>All-electric design may be infeasible if</p> <ul style="list-style-type: none"> • It is demonstrated physical or technical constraints specific to site and occupancy prohibit elements, spaces or features necessary for full and strict compliance with all requirements for new construction; and • If gas piping systems and fixtures are substituted for electrical equipment serving a specific system or area, the project is able to attain full and strict compliance with all requirements for new construction. <p>Proposal to install a technology, system, or design that is inconsistent with, or not allowed by the discretionary determination by a City agency shall not be a basis for demonstration of infeasibility.</p>

¹ The linear footage of street frontage is calculated by adding the lengths of all property lines directly adjacent to the right of way.

3) THIRD-PARTY REVIEW FOR DETERMINATION OF INFEASIBILITY

Compliance with San Francisco Building Code Section 106A.1.17.1 and all other requirements for new construction have been determined to be practical and feasible in general. San Francisco Building Code Section 106A.1.17.1 allows for approval of exception allowing gas infrastructure and piping systems to be installed on a case-by-case basis where All-Electric construction is demonstrated to be infeasible.

The conditions of infeasibility depend substantially on design details, and design development provides substantial opportunity to address physical and technical conditions. An application for design review for exception due to infeasibility will not be approved in the absence of substantial architectural detail, including the architectural addendum and Title 24 compliance documentation.

Prior to DBI review of an application for exception due to infeasibility, a Third-Party Review of All-Electric Feasibility must be completed by engineers with specialized understanding of electrical engineering, mechanical design, energy efficiency including compliance with Title 24 Energy Standards, and experience with the design of all-electric systems for space conditioning and water heating. In all cases, it is the responsibility of the Design Professional of Record, with the support of the entire project team, to apply all available energy efficiency and electric load minimization practices.

Review of All-Electric Feasibility

Review of All-Electric Feasibility is a document that addresses three questions:

- What specific constraint causes all-electric design to be physically or technically infeasible, but does not apply to mixed-fuel?
- Can the constraint be resolved?
- Is the area and system proposed served by gas piping systems ready for conversion to all-electric in the future, and constructed to provide equivalent health, safety and fire protection?

To address these questions, a Review of All-Electric Feasibility must include:

- **Identify the physical or technical constraint:** Document the specific physical or technical issue that results in the infeasibility of All-Electric design of the project.
- **Identify alternatives:** Based on review of plans, calculations, and supporting documentation, identify methods, equipment, and design features available to resolve the physical or technical issue to mitigate infeasibility.
 - **Efficiency:** Where the issue relates to peak electrical load, energy efficiency construction practices, design options, and compliance credits can commonly contribute to resolving the issue. For the all-electric design, confirm all available compliance credits have been applied. Confirm all available energy efficiency design and construction practices have been applied to all building features contributing to loads regulated by Title 24 Energy Standards. Confirm equipment specified is no less efficient than prescriptive baseline specified by Title 24 Energy Standards.
 - **Mechanical:** Review envelope and architectural features and mechanical design are consistent with minimization of load on mechanical equipment. Determine whether space conditioning and water heating electric peak load can be reduced via piping or plumbing design, equipment sizing, equipment layout, or substitution of equipment type. Mechanical equipment must be no less efficient than electric prescriptive baseline, where such a baseline is provided by Title 24 Energy Standards.²
 - **Electrical:** Review electrical panel schedule and load calculations for the all-electric design. Confirm connected electrical load and demand electric load for the all-electric design are calculated in accord with California Electrical Code, and are consistent with the design for compliance with Title 24 Energy Standards.
 - Provide documentation of examples of all-electric design and construction of similar systems and circumstances.

² Mechanical equipment is not required to be more efficient than US DOE Appliance and Equipment Standards applicable to the specified device, provided all options are exhausted regarding piping or plumbing design, equipment sizing and layout, and substitution of alternative equipment types.

- **Document Available Solutions:** Review the mixed-fuel design, and document the specific area and system proposed as mixed-fuel. Confirm that the physical or technical constraint will specifically be resolved by granting an exception allowing mixed-fuel construction of the area and system. Confirm proposed gas piping systems, fixtures, and infrastructure are limited to the system or area of the building for which All-Electric design is infeasible.
- **Apply Electric Ready Design Guidelines:** Areas served by gas piping systems, fixtures, and infrastructure must prepare for future retrofit to all-electric by installing sufficient electrical conductors and raceways, bus bar capacity, and overcurrent protection, and providing sufficient space and drainage for future replacement of gas systems with electric. Reviewers shall affirm that the project design conforms to the relevant provisions of Electric Ready Design Guidelines to the extent feasible.
- **Recommendation Regarding Health, Safety, and Fire Protection:** Review construction methods, safety equipment, and design features proposed. Recommend specific design features, equipment, and construction practices sufficient to ensure the project's modified design provides equivalent fire-protection and health and safety to all-electric design.
- Documentation of the above via a report addressing each item above in detail.

Review documentation must be incorporated into plans, with signature by a reviewer for each discipline (electrical, mechanical, and architectural/Title 24), and stamp by the Design Professional of Record.

QUALIFICATIONS FOR ALL-ELECTRIC THIRD-PARTY REVIEWERS

All-Electric Third-Party Reviewers must apply specialized knowledge and experience in the application of energy efficiency design and construction; compliance of all-electric systems with Title 24 Energy Standards, and experience with the design of all-electric systems for space conditioning and water heating. The review team must include each of the following:

Item	Qualification	Minimum Experience
1	Licensed Professional Engineer with Mechanical Specialty	Design and demonstration of compliance for at least one all-electric project which is: <ul style="list-style-type: none"> • Either multifamily (3 or more housing units), or commercial (minimum of 10,000 square feet floor area); AND • Either <ul style="list-style-type: none"> - Construction of a new building, OR - Alteration where scope included replacement of space conditioning and water heating systems.
2	Licensed Professional Engineer with Electrical Specialty	
3	California Association of Building Energy Consultants – Certified Energy Analyst	Title 24 documentation accepted for compliance for at least one all-electric new construction project of the same or similar occupancy to the project under review.

Each of the above disciplines must be represented by individuals not employed by a company responsible for the design or construction of the project.

Due to the qualifications required, review is expected to be performed by a team, but individuals holding multiple qualifications may serve more than one role.

Process for Physical Constraint in Small Infill Sites: Projects seeking exception on the basis of Physical Constraint in a Small Infill Site (Category C above):

- Persons responsible for the design of the project may be responsible for preparation of the review.
- Reviewer(s) must include a minimum of two disciplines:
 - Licensed Professional Engineer with Electrical Specialty, AND
 - Either Licensed Professional Engineer with Mechanical Specialty, or CABEC Certified Energy Analyst.
- The Review for All-Electric Feasibility must address each of the considerations in the *Review for All-Electric Feasibility* section above.

4) SUBMITTALS REQUESTING EXCEPTION ALLOWING A MIXED-FUEL BUILDING SYSTEM OR AREA

If an exception to San Francisco Building Code Section 106A.1.17.1 is granted due to infeasibility, supplemental documentation is required:

- **Project Submittals:** Installation of gas infrastructure and piping systems is strictly limited to the system and area of the building for which all-electric design is infeasible, or systems not specifically regulated by San Francisco Building Code 106A.1.17.1. Project submittals providing any construction detail related to piping systems or mechanical system design must be consistent with all-electric design and construction for all systems and areas excepting the area and system determined to be infeasible.
- **Energy Standards:** Newly constructed buildings are subject to local energy design requirements stricter than California Title 24 Building Energy Efficiency Standards, including provisions specific to Mixed Fuel buildings. See Administrative Bulletin 93 for details.

PERMISSION TO CONSTRUCT A MIXED-FUEL BUILDING DUE TO INFEASIBILITY

San Francisco Building Code Section 106A.1.17.1 allows the approval of an exception allowing issuance of a permit to construct a new mixed-fuel building only on a case-by-case basis. In order to obtain an exception to San Francisco Building Code Section 106A.1.17.1, the applicant must:

1. Complete a *Special Third-Party Review of All Electric Feasibility*. The third-party review documents the specific area and system proposed to be constructed as mixed-fuel and the basis for a determination all-electric design is infeasible.
2. Submit a *Request for Approval of Local Equivalency for Modification or Alternate Materials, Design, or Methods of Construction* (Administrative Bulletin 005), including two copies of the following documentation of the proposed modification to materials and methods of construction:
 - a. Project plans specifying the area and system proposed for mixed-fuel construction
 - b. *Review of All Electric Feasibility*
 - c. Acknowledgement of energy performance requirements that apply to mixed-fuel design (see Administrative Bulletin 93)
 - d. Affirmation of the specific provisions of Electric Ready Design Guidelines (Attachment 2) that pertain to the area and system of mixed fuel construction. If it is not feasible for the mixed-fuel area or system to fully comply with the guidelines, the project sponsor shall specify the extent to which the guidelines are feasible.
3. Review meetings will be conducted by the Department of Building Inspection, with the Department of Environment and the Fire Department where applicable, to consider the request for approval of *Request for Approval of Local Equivalency for Modification or Alternate Materials, Design, or Methods of Construction* (Administrative Bulletin 005). Attendance at such review meetings will include, at a minimum, the Design Professional of Record, the project mechanical engineer, and the Third Party Reviewers.

At such meetings, it is the responsibility of the project applicant to demonstrate infeasibility. Staff will

- Review plans, calculations, and supporting documentation for all-electric options demonstrate all available energy efficiency features, practices, and credits for third-party review were applied to the all-electric option.
- Review alternative technologies and approaches considered prior to the All Electric Third Party Reviewers making a determination.
- Review the mixed-fuel design, including the specific area and system served by gas piping systems, fixtures, and infrastructure
- Review conditions proposed to ensure the project's modified design provides equivalent fire-protection and health and safety to all-electric design.

The request will either be:

- Approved with conditions by DBI with concurrence by Department of Environment,

- Placed on “hold” pending submittal of additional information, or
- Disapproved.

Determinations as to infeasibility may be appealed to the Board of Examiners, as established under Section 105.1 of the San Francisco Building Code. See <https://sfdbi.org/board-examiners> for details.

The project sponsor is responsible for the hiring of Third Party Reviewers from the list of approved All-Electric Third Party Reviewers maintained by the Department of Building Inspection. The project sponsor is responsible for all costs related to All Electric Third Party Review.

Plan review fees are required to be paid as noted in Administrative Bulletin 005.

4. Upon approval to construct a mixed-fuel building, a copy of the signed form approving the equivalency and indicating all conditions of approval will be part of the permanent record of the project, and a copy will be sent to the project sponsor. The project sponsor shall include all specified conditions in plans.

PROJECT COMPLETION

Final compliance verification documentation (Attachment 3) is required prior to final inspection. No final Certificate of Completion may be issued until All-Electric Ordinance: Final Compliance Verification has been received, reviewed, and accepted by the Department of Building Inspection.

Failure to ensure the project is designed and constructed in a manner consistent with an exception and conditions approved will subject the project to all of the enforcement and abatement remedies detailed in the San Francisco Building Code.

LIST OF ALL-ELECTRIC THIRD-PARTY REVIEWERS

The Department of Building Inspection with the assistance of Department of Environment shall regularly conduct a Request for Qualifications to identify professionals with specialized knowledge and experience in the application of energy efficiency design and construction; compliance of all-electric systems with Title 24 Energy Standards, and experience with the design of all-electric systems for space conditioning and water heating. Department of Building Inspection shall provide upon request a list of individuals who have provided evidence of holding such qualifications. Third-Party Review of All-Electric Feasibility will only be considered when prepared by an individual listed as holding the appropriate qualifications. Submittal of substantially inadequate or incorrect analysis will be grounds for removal from the list of qualified reviewers.

Signed by:

Director
Department of Building Inspection

Attachment 1: Design Guideline for Electric Ready Buildings

San Francisco Building Code Section 106A.1.17, Exception (1) requires Mixed-Fuel Buildings to be as “Electric-Ready” as feasible. Electric Ready is defined as:

***ELECTRIC-READY.** A building, project, or portion thereof that contains electrical systems and designs that provide capacity for a future retrofit of a Mixed-Fuel Building to an All-Electric Building. Electric-Ready includes sufficient space, drainage, electrical conductors or raceways, bus bar capacity, and overcurrent protective devices.*

Design Guideline for Electric Ready Buildings is adapted from California Energy Codes & Standards Program 2019 Model Electric Readiness Code (www.localenergycodes.com), and provided as a reference for how to fulfill the Electric-Ready requirements of San Francisco Building Code Section 106A.1.17, Exception (1).

Since exceptions are limited to the specific areas or systems where All Electric design is physically or technically infeasible, even in Mixed Fuel Buildings nearly all systems will be All-Electric.

These guidelines do not require the design of electric replacement systems and as such do not necessarily assure that the conversion to all-electric will be directly feasible in all cases. Instead, the requirements specify power equivalencies for provision of a given service via all-electric and offer flexibility regarding locations for replacement equipment. These guidelines do not include space and ventilation requirements for engineered systems (e.g., space or water heat systems serving multiple dwelling units or large spaces), and as such, conversion to all-electric will be dependent upon the ability to provide these components. Future upgrades of the utility-side electric power service may require additional space for equipment. For the reasons stated above, permit applicants are encouraged to prepare an initial design for future replacement with electric systems to address future locations for heat absorption, transfer and distribution equipment, as well as electric power systems.

Electric Ready Guidelines for Residential (Type R Occupancy)

General

New residential Mixed-Fuel Buildings that are Electric Ready provide capacity for a future retrofit to facilitate the installation of all-electric equipment for all equipment requiring provision of fuel gas, and future de-commissioning of all gas piping, connections. An Electric Ready design provides space, drainage, installs electrical conductors or raceways, reserves bus bar capacity, and reserves space for overcurrent protective devices for future replacement of all gas-dependent equipment with all-electric equipment. and for equipment serving individual units only, service panel capacity and pre-wired and installed overcurrent protective devices.

Space Heat

Systems using natural gas heating equipment shall include the following components for each gas terminal or stub out:

Equipment serving individual dwelling units:

1. A dedicated 240 volt, 30 amp or greater electrical circuit for a future electric replacement heater;
2. The circuit shall terminate within 3 feet from the designated future location of an electric replacement heater with no obstructions into a listed cabinet, box or enclosure labelled “For Future Electric Space Heater”;
3. The circuit shall be served by a dedicated double pole circuit breaker in the electrical panel labeled with the words “For Future Electric Space Heater”; and

EXCEPTION. If a 240 volt 30 amp or greater electrical circuit exists for space cooling equipment, an additional circuit for space heating is not necessary.

Equipment serving multiple dwelling units or common areas

1. Equipment serving multiple dwelling units or common areas shall have conductors or raceway installed with termination points at the main electrical panel (via subpanels panels, if applicable) and at a location no more than 3 feet from each gas outlet or a designated location of future electric replacement equipment. The conductors or raceway and any intervening subpanels shall be sized to meet the future electric power requirements as specified below and in the "Conductor, Raceway and Subpanel Sizing" Section below.

A. 24 amps at 240 volts per dwelling unit, or

B. The electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

EXCEPTION: If permanent space cooling equipment is installed for all of the affected dwelling units, the raceway and/or conductors serving the cooling equipment may be sized to accommodate the future electric space heating equipment.

Water Heat

Systems using natural gas or propane water heating equipment shall include the following components for each gas terminal or stub out:

Equipment serving individual dwelling units

Equipment serving individual dwelling units shall be located in an area that is at least 3 feet by 3 feet by 7 feet high.

Equipment serving multiple dwelling units or common areas

Install conductors or raceway with termination points at the main electrical panel (via subpanels panels, if applicable) and into a listed cabinet, box or enclosure at a location no more than 3 feet from each gas outlet or a designated location of a future electric replacement water heater labelled "For future water heater". The conductors or raceway and any intervening subpanels shall be sized to meet the future electric power requirements as specified below and in the "Conductor, Raceway and Subpanel Sizing" Section below.

1. 24 amps at 240 volts per dwelling unit, or

2. 1.2 kVA for each 10,000 Btus per hour of rated gas input or gas pipe capacity, or

3. The electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Clothes Drying

Buildings plumbed for natural gas or propane equipment shall include the following components for each gas terminal or stub out:

Equipment serving individual dwelling units

1. A dedicated 240 volt, 30 amp or greater electrical receptacle within 3 feet of the equipment and accessible with no obstructions;
2. The receptacle shall be labeled with the words "For Future Electric Clothes Dryer"; and
3. A double pole circuit breaker in the electrical panel labeled with the words "For Future Electric Clothes Dryer".

Equipment serving multiple dwelling units or common areas

Equipment serving multiple dwelling units or common areas shall include conductors or raceway installed with termination points at the main electrical panel (via subpanels panels, if applicable) and at a location no more than 3 feet from each gas outlet or a designated location of future electric replacement equipment. The conductors or raceway and any intervening subpanels shall be sized to meet the future electric power requirements as specified below and in the "Conductor, Raceway and Subpanel Sizing" Section below.

1. 24 amps at 240 volts per dwelling unit, or
2. 0.85 kVA for each 10,000 Btus per hour of rated gas input or gas pipe capacity, or
3. The electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Combined Cooktop and Oven or Stand Alone Cooktop

Buildings plumbed for natural gas or propane equipment shall include the following components for each gas terminal or stub out:

1. A dedicated 240 volt, 40 amp or greater circuit and 50 amp or greater electrical receptacle located within 3 feet of the equipment and accessible with no obstructions;
2. The electrical receptacle shall be labeled with the words "For Future Electric Range" and be electrically isolated; and
3. A double pole circuit breaker in the electrical panel labeled with the words "For Future Electric Range".

Stand Alone Cooking Oven

Buildings plumbed for natural gas or propane equipment shall include the following components for each gas terminal or stub out:

1. A dedicated 240 volt, 20 amp or greater receptacle within 3 feet of the appliance and accessible with no obstructions;
2. The electrical receptacle shall be labeled with the words "For Future Electric Oven" and be electrically isolated; and
3. A double pole circuit breaker in the electrical panel labeled with the words "For Future Electric Oven".

Pools and Spas

Natural gas or propane equipment pools or spas shall have conductors or raceway installed with termination points at the main electrical panel (via subpanels panels, if applicable) and at a location no more than 3 feet from each gas outlet or a designated location of future electric replacement equipment.

The conductors or raceway and any intervening subpanels shall be sized to meet the future electric power requirements as specified below and in the "Conductor, Raceway and Subpanel Sizing" Section below.

1. 0.75 kVA per 10,000 Btus per hour of rated gas input or gas pipe capacity, or
2. The electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Service Capacity

Electric load calculations must reflect all loads for systems as installed at the time of new construction, and reflect expected future loads or increases to load as a result of compliance with Electric Ready Design Guidelines.

1. All newly installed electrical panels and subpanels serving common loads in a Mixed-Fuel Building shall have both space for overcurrent protective devices as well as bus bars of adequate capacity to meet all of the building's potential future electrical requirements as specified in the sections above. The engineer of record shall document future expected total electrical load for the building when modified to All-Electric, in order to affirm adequate capacity of the electrical equipment.

Exception: If the electric load serving entity requires that the electric service be upgraded as a result of the requirements of these guidelines, then adequate physical space must be designated for future installation of panels, switchgear, and bus bars sufficient to meet the building's future electrical requirements as specified in these guidelines. Upgrade to electric service is not required.

2. All newly installed raceways in a Mixed-Fuel Building between the main electric panel and any subpanels, and the point at which the conductors serving the building connect to the common conductors of the utility distribution system, shall be sized for conductors adequate to serve all of the building's potential future electrical requirements as specified in these guidelines.

3. The service capacity requirements of this section shall be determined in accordance with the "Conductor, Raceway and Subpanel Sizing" Section below.

Conductor, Raceway and Subpanel Sizing

1. Raceway and subpanel capacity shall be sized to be large enough to meet the requirements at the service voltage.
2. The electrical capacity requirements may be adjusted for demand factors in accordance with the California Electric Code, Title 24, Part 3, Article 220.
3. For purposes of gas pipe equivalence, gas pipe capacity shall be determined in accordance with the California Plumbing Code, Title 24, Part 5, Section 1208.4.

Condensate Drains

The conductors or raceway required in space heating and domestic hot water shall terminate in areas that have condensate drains that are:

1. No less than $\frac{3}{4}$ inch in diameter;
2. Compliant with the California Plumbing Code, Title 24, Part 5, Section 814; and
3. No more than two inches higher than the floor.

EXCEPTION to Sections 4.508.1 through 4.508.10. If the design includes bus bar capacity, raceway or conductor capacity, space and condensate drainage necessary for the installation of electrical equipment that can serve the intended function of the gas equipment, as calculated and documented by a licensed design professional associated with the project.

Electric Ready Guidelines for Non-Residential (All Occupancies other than R)

General

New nonresidential Mixed-Fuel Buildings shall have electrical systems and designs that provide capacity for a future retrofit to facilitate the installation of all-electric equipment for all gas equipment plumbing connections. This includes space, drainage, electrical conductors or raceways, bus bar capacity, and space for overcurrent protective devices.

Circuit Capacity

A Mixed-Fuel Building shall have conductors or raceway installed with termination points at the main electrical panel (via subpanels panels, if applicable) and at a location no more than 3 feet from each gas outlet or a designated location of future electric replacement equipment. The conductors or raceway and any intervening subpanels shall be sized to meet the future electric power requirements, as specified below, at the service voltage. The capacity requirements may be adjusted for demand factors in accordance with the California Electric Code, Title 24, Part 3, Article 220. Gas flow rates shall be determined in accordance with the California Plumbing Code, Title 24, Part 5, Section 1208.4.

Domestic Hot Water

For equipment serving nonresidential space, common areas or multiple dwelling units, 1.2 kVA for each 10,000 Btus per hour of rated gas input or gas pipe capacity or the electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Space Heating

For equipment serving nonresidential space, common areas or multiple dwelling units, the electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

EXCEPTION. If permanent space cooling equipment is installed for all of the affected conditioned space the conductors or raceway serving the cooling equipment may be increased in size to accommodate the future electric space heating equipment.

Clothes Dryer

Provide 0.85 kVA for each 10,000 Btus per hour of rated gas input or gas pipe capacity for commercial dryers, or the electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Pools and Spas

Provide either:

- a. 0.75 kVA per 10,000 Btus per hour of rated gas input or gas pipe capacity, or
- b. The electrical power required to provide equivalent functionality of the gas powered equipment as calculated and documented by a licensed design professional associated with the project.

Electric Readiness: Service Capacity

Electric load calculations must reflect all loads for systems as installed at the time of new construction, and reflect expected future loads or increases to load as a result of compliance with Electric Ready Design Guidelines.

All newly installed electrical panels and subpanels in a Mixed-Fuel Building shall have both space for overcurrent protective devices as well as bus bars of adequate capacity in the main electrical panel and any subpanels to meet all of the building's potential future electrical requirements as specified in these guidelines. The engineer of record shall document future expected total electrical load for the building when modified to All-Electric, in order to affirm adequate capacity of the electrical equipment.

Exception: If the electric load serving entity requires that the electric service be upgraded as a result of the requirements of these guidelines, then adequate physical space must be designated for future installation of panels, switchgear, and bus bars sufficient to meet the building's future electrical requirements as specified in these guidelines. Upgrade to electric service is not required.

All newly installed raceways in a Mixed-Fuel Building between the main electric panel and any subpanels, and the point at which the conductors serving the building connect to the common conductors of the utility distribution system, shall be sized for conductors adequate to serve all of the building's potential future electric loads as specified in these guidelines.

Electric Readiness: Condensate Drains

The conductors or raceway required for domestic hot water and space heating systems shall terminate in areas that have condensate drains that are:

- a. No less than $\frac{3}{4}$ inch in diameter;
- b. Compliant with the California Plumbing Code, Title 24, Part 5, Section 814; and
- c. No more than two inches higher than the floor.

Attachment 2: Summary of Investor Owned Utility Options for Proposed Electric Load Exceeding Capacity of Utility Infrastructure

Investor owned utilities such as Pacific Gas and Electric Company are regulated by California Public Utilities Commission under the California Public Utilities Code. Per CPUC-approved Electric Rule 2, a utility may not refuse to extend electric service to customers in PG&E's service territory provided the customer complies with applicable tariff, easement and safety and reliability requirements. In situations where existing infrastructure may not be capable of serving a new load proposed by a customer, PG&E will apply the appropriate tariffs and associated cost responsibilities in order to serve the new load.

If a project proposes peak load and/or generation that exceeds the capacity of existing utility infrastructure serving the location, or if the utility determines the change would push service voltage levels out of ranges specified in CPUC Electric Rule 2.C, there are three possibilities:

- **Modify Design:** The project may be modified to reduce the proposed peak load and/or generation to match existing infrastructure capacity, such as through efficiency, battery storage, or other modifications.
- **Upgrade Utility Equipment Dedicated to the Project:** The project sponsor can upgrade service infrastructure, subject to Electric Rule 16, and utility will provide the level of service supported by the upgraded service infrastructure.
- **Wait for Utility Facility Upgrade:** If the requested peak load and/or generation can only be met after upgrades to distribution or transmission infrastructure are completed by the utility, it may take some time to construct the facilities necessary to serve the new load. The project sponsor may coordinate a construction and service level schedule to accommodate the time needed to construct the facilities as well as a ramp up schedule of the project's load.

Alternative: When a request for service exceeds limitations specified in Electric Rule 2, the Exceptional Case provision of Electric Rule 16.G allows:

“When the application of this rule appears impractical or unjust to either party, or ratepayers, PG&E or Applicant may refer the matter to the Commission for a special ruling or for approval of special conditions which may be mutually agreed upon.”



All-Electric Ordinance: Final Compliance Verification

Attachment 3

This form must be completed prior to issuance of a final Certificate of Completion.

Address: _____

Permit Application Numbers: _____

This project has been designed and constructed to comply with San Francisco Building Code Section 106A.1.17.1.
Check one:

<input type="checkbox"/>	No gas piping systems have been installed.
<input type="checkbox"/>	Gas piping systems have been installed

If gas piping systems have been installed:

<input type="checkbox"/>	The project is Mixed-Fuel, and gas piping systems, fixtures, and infrastructure have been installed, but are limited to the specific system and area approved under AB-112 and AB-005.	
	Indicate System(s):	Indicate Area(s). Include reference to plan sheets.
	_____	_____
<input type="checkbox"/>	Gas piping systems and infrastructure have been installed serving uses not specifically regulated by San Francisco Building Code Section 106A.1.17.1. List systems below:	
	Indicate System(s):	Indicate Area(s). Include reference to plan sheets and AB-005 approval.
	_____	_____

As the Design Professional of Record, I verify the project has been constructed to comply with San Francisco's Building Code Section 106A.1.17.1.

Every area served by gas piping (as indicated above) has been designed and constructed for future conversion to all-electric, in a manner consistent with AB-112 *Design Guideline for Electric Ready Buildings* to the maximum extent possible. All conditions approved under AB-005 for provision of equivalent health, safety, and fire-protection have been fulfilled.

Signed: _____ Date: _____

Affix professional stamp:

Staff Use Only: Project has been inspected: Sign & Date:
