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UNITED ASSOCIATION OF JOURNEYMEN AND APPRENTICES
OF THE PLUMBING AND PIPE FITTING INDUSTRY

LOCAL UNION NO. 38

1621 MARKET STREET • SAN FRANCISCO, CA 94103

October 1, 2020

Mayor London N. Breed
City Hall, Room 200
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102
Email: MayorLondonBreed@sfgov.org

Board of Supervisors
c/o **Angela Calvillo**, Clerk of the Board of Supervisors
1 Dr. Carlton B. Goodlett Place
City Hall, Room 244
San Francisco, Ca. 94102-4689
Email: Board.of.Supervisors@sfgov.org

Debbie Raphael
Director of the San Francisco Department of the Environment
1455 Market Street, Suite 1200
San Francisco, CA 94103
Email: environment@sfgov.org

RE: File No. 200701 Ordinance amending the Building Code to require new construction to utilize only electric power

Dear Mayor Breed, Board of Supervisors, and Ms. Raphael:

I am writing on behalf of Local 38 to request amendment of the proposal to adopt a local ordinance amending the San Francisco Building and Environment Codes to require new construction to utilize only electric power.

I. Electrification of Buildings Must Address Impacts on Workers; Electrification Eliminates an Entire Sector of Skilled Construction Work.

Without amendment, Local 38 opposes the proposed ordinance banning gas piping and appliances in new construction because it fails to address the significant and immediate loss of good paying, skilled construction jobs that will result from this ban. While the UA and Local 38 support the goal of drastically reducing greenhouse

gas (GHG) emissions, eliminating gas plumbing from all new building construction poses a real and immediate threat to the livelihood of plumbers by eliminating an entire sector of new building construction work without any plan to replace these jobs.

As society takes the necessary policy steps to reducing GHGs, it cannot ignore to the unintended impacts some of these policy decisions have on workers. Where entire job sectors are being eliminated or minimized, we need to ensure steps are in place to provide the affected workers with a "just transition" to replacement work. And we need to ensure that those steps are taken concurrently because we know from experience that just transition never happens after the fact. Too often, "just transition" is just an empty promise.

Local 38 understands that the Board and many members of the community are impatient to adopt an electrification ordinance. But it cannot be ignored that this ordinance will create immediate significant job losses for Local 38's members and others. An action with such significant job loss impacts should not be rushed through without ensuring that these job losses will be mitigated. Local 38 urges the committee to have staff sit down with Local 38 to ensure that a path for just transition is incorporated into this ordinance before it leaves this committee.

II. A Path for Just Transition Exists that Aligns with the City's Energy and Water Efficiency Goals

The additional electrical work created by a mandatory electrification ordinance for new construction will be just a small fraction of the work hours lost by eliminating gas plumbing in buildings. Moreover, the minimal amount of additional work that would be created is performed by an entirely different craft and will not create substitute employment opportunities for the skilled plumbers whose livelihood is directly impacted by this ordinance. Nor can this work be replaced by "outreach, education, and support for workforce training" as recommended by the San Francisco Department of the Environment.

However, there is a path to mitigating the ordinance's elimination of an entire sector of skilled plumbing new building construction work, while at the same time furthering San Francisco's goals to reduce both energy and water use. In order to provide a just transition to plumbers that will no longer be employed installing gas piping and appliances in new building construction, the electrification ordinance should be tied to additional requirements to expand the use of graywater, rainwater and/or recycled water, with a particular focus on the use of alternative water sources within buildings for non-potable applications. Such a requirement would provide those workers most directly impacted by this ordinance with with new replacement work that will further benefit San Francisco by also providing substantial energy and water savings.

Specifically, the following requirements should be concurrently adopted by San Francisco:

A. New construction projects subject to the electrification ordinance should be required to pre-plumb buildings for indoor use of alternative water sources – either recycled water or on-site treated graywater/rainwater depending on availability.

B. New construction projects subject to the electrification ordinance should be required to install solar hot water systems or graywater heat recovery systems that preheat cold water with the heat from wastewater.

C. Buildings subject to electrification requirements should have the option to instead use renewable gas where available, including approval of pilot programs.

D. Certification – Require the use of a "skilled and trained workforce as defined in Public Resources Code Section 2600 for installation of graywater/rainwater systems over a certain size threshold, plumbing for indoor use of recycled water/graywater/rainwater, and onsite treatment systems.

III. Just-Transition Alternative Water Source Requirements Must Be Adopted Concurrently with the Effective Date of the New Construction Electrification Requirements

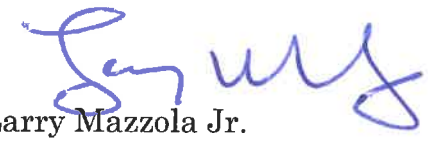
Local 38 strongly urges the Board to ensure that mandatory electrification requirements adopted for new construction are adopted concurrently with just-transition alternative water requirements. Experience shows that just transition solutions must be addressed concurrently with the policy changes that raise the need for a just transition. The proposed electrification ordinance for new construction will result in immediate and drastic impacts on the livelihood of plumbers who currently install gas infrastructure in buildings. Replacement work needs to be made available concurrently with the elimination of this existing work.

For that reason, the proposed electrification ordinance should be adopted with the following additional requirements incorporated into the ordinance: (1) staff shall immediately commence proceedings to develop and adopt mandatory dual plumbing and other alternative water requirements; (2) staff shall propose an ordinance with mandatory dual plumbing and other alternative water requirements for adoption no later than July 1, 2021; (3) the effective date of the proposed electrification ordinance for new construction shall be 30 days after adoption of an ordinance with mandatory dual plumbing and other alternative water requirements.

IV. Conclusion

Local 38 requests an opportunity to meet with staff prior to the next Committee hearing in order to work out a path to address this critical issue. The job losses that will result from this proposed ordinance are real and will be immediate.

Sincerely



Larry Mazzola Jr.
Bus. Mgr. & Fin.Secty-Treas.
UA Plumbers & Pipefitters Local 38

From: Sonia Van Braden
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Ronen, Hillary
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Wednesday, September 23, 2020 9:40:44 PM

Land Use Committee, Board of Supervisors, and Sup. Ronen,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sonia Van Braden
svanbraden@gmail.com
608 Andover St
San Francisco, California 94110

SPUR
San Francisco | San Jose | Oakland

9/18/2020

Land Use and Transportation Committee
San Francisco Board of Supervisors
1 Dr. Carlton B. Goodlett Place
City Hall, Room 244
San Francisco, CA 94102

Dear Supervisors Peskin, Safai, and Preston,

On behalf of SPUR, I am writing to express support for the proposed ordinance amending the building code mandating all new construction be all-electric (File #200701). This ordinance would require new construction to use only electric power, with a delayed effective date for restaurants and an exception for buildings where it is physically or technically infeasible.

To meet California's climate goals of reducing greenhouse gas emission by 40 percent by 2030 and 80 percent by 2050, the state needs to move expediently to electrify buildings, while decarbonizing the electrical grid. The state is making good progress toward decarbonizing its energy grid, but is falling behind in efforts to electrify buildings. Bay Area Air Quality Management District projected in their 2017 Clean Air Plan that for the region to meet its climate goals, 100 percent of new residential construction needs to be zero net energy by 2020, with new commercial construction following suit by 2030. Clearly the Bay Area has failed to meet its goal of electrifying residential buildings by 2020. We need to act urgently to make up for lost time.

In our report, *Fossil Free Bay Area*, SPUR identified electrifying buildings as one of nine key strategies for the Bay Area to achieve a zero-carbon future. Thirty-three cities in California have already passed reach codes to reduce buildings' reliance on natural gas. San Francisco is one of those, having banned natural gas appliances in its municipal buildings earlier this year. San Francisco is in position to lead again on this issue by demonstrating that all-electric residential buildings are economically feasible to build and attractive to consumers.

However, given San Francisco's need to address its housing shortfall, the city should carefully monitor the impact of this ordinance to ensure that it does not discourage construction of new housing units. Of particular concern are master-planned projects with a signed Development Agreement and natural gas mains already in place before this ordinance goes into effect. SPUR suggests to explore either grandfathering in certain of the buildings in these projects in to allow construction of mixed-fuel buildings, or to find other ways of helping the developers recover the cost of installing the gas mains. Two projects in San Francisco, Treasure Island and Pier 70, would fit in this special circumstance. SPUR urges the author of the bill to work with the affected parties to address their concerns.

Sincerely,

Laura Feinstein

Laura Feinstein, Ph.D.
Sustainability and Resilience Policy Director

From:	Sven Thesen
To:	Peskin, Aaron (BOS); Hepner, Lee (BOS); Safai, Ahsha (BOS); Sandoval, Suhagey (BOS); Preston, Dean (BOS); Smeallie, Kyle (BOS); MandelmanStaff, [BOS]; Bintliff, Jacob (BOS); Raphael, Deborah (ENV); Board of Supervisors, (BOS); Major, Erica (BOS)
Cc:	dktahara@gmail.com; Marc Geller; James Tuleya; John Brown; Craig Gordon
Subject:	Invitation, All Electric Home Virtual Tour, San Francisco Supervisors & All-Electric New Construction Ordinance (File 200701)
Date:	Monday, September 21, 2020 9:16:56 AM
Attachments:	ProjectGreenHome Booklet 2016-digital Small.pdf

Gentle San Francisco Supervisors,
To aid you in your deliberations regarding electrification Reach Codes, you are individually and collectively invited to virtually tour our all electric home today, Monday from 10a to 4p. Pick your time and email/ call me 415-225-7645*. Understanding the short notice, we are happy to schedule at other times and also invite staff, significant others and interested parties. The honor of the tour is ours.

Our ~2300ft2 home has been all electric** since 2011 when it was constructed. In summary, having lived with gas in prior homes, my wife and I have determined that our standard of living/ quality of life is simply better with the all electric home. It's safer, more convenient and cheaper than the electric / gas home.

As background, for our strong support for electrification, my wife, the physician, and I, the chemical engineer, (& as parents), are from a micro perspective, particularly concerned about indoor ambient air quality and the dangers from burns and fires associated with gas stoves. On the macro side, we are equally concerned about the overall carbon footprint of our society and the associated impacts including sea level rise, droughts, fires, floods, species (including humans) migration/ loss and more.

I have attached a booklet*** on the home; the website is ProjectGreenHome.org and we were featured in Bay Area Bountiful in 2019, https://www.youtube.com/watch?v=lUVnYjs9JsA the story starts at 00:59

Best,
Sven Thesen & Kate Kramer, MD

*If these dates/ times are not convenient, we can schedule for later, again, feel free to ping me. We have had over 4,000 people through the house since 2009 including CEC commissioners, politicians of all stripes, staff from CARB, CPUC & CEC, the public and even scouts and Sunday school classes.
**Natural gas history: The home was designed in 2008/9 and built 2010/11, when heat pumps, etc. were in the "toddler" adoption stage in the United States. We were concerned that the induction stove, the heat pump, the condensing dryer, all or some, would not work so we plumbed for gas & had a gas connection. Turns out that it does all work and so we had the utility "cut" the gas line in 2013 (& stopped paying the monthly connection fee). Had we not installed gas from the beginning, we would have likely saved on the order of $10k in construction and permitting costs.

*** Sorry, it needs updating to the present. My kids are so tall now!

--
Sven Thesen, 415-225-7645
EV Consultant & Founder, ProjectGreenHome.org and BeniSolSolar.com; Wonder Junkie

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Electric Cars are Cheaper than Cell Phones! See:
http://www.projectgreenhome.org/articles.html

Project Green Home

The Beyond LEED Platinum,
Zero Net Energy,
Passive House

ProjectGreenHome.org

Definition Purpose Features

314 Stanford Ave
Palo Alto CA

When we started thinking about building a home from "scratch", we saw an opportunity to examine the environmental impact from the ground up, and what we could do to minimize the home's "total lifetime carbon cost." Within this context, we decided to put the theories and green rating systems (Leadership in Energy & Environmental Design, Zero Net Energy and Passive House) into practice. The result is this beautiful, functional, comfortable, ultra efficient, low carbon house. We hope that others may be inspired, and in their turn, move the efficiency bar even further forward.

Of course, nothing exists in a vacuum. Our work on this house has involved partner- contractors and architects, but also our friends, neighbors, high school and university students, and others. It is more than just our home;it has brought us closer to the community around us.

Wake up America! In our opinion, global warming is and will be the single most important issue for the current and next several generations. As shown below, the earth's atmospheric carbon dioxide (CO2) concentration has increased by almost 130 ppm since ~1850 and over 25 ppm just in the last 10 years! We have to do something!

Having now lived here for over two years, Project Green Home proves that we can address global warming and have a beautiful, comfortable, functional and sustainable home.

-Sven Thesen and Kate Kramer

Date / Activity	<1850 pre-industrial	2006 looking at homes	2008 bought property	2010 began construction	2012 moved in	**2016** **present**
CO_2 (ppm)	280	380	384	388	392	**408**

October 2010, daughters Sophia and Genevieve indicate their position on Proposition 23. Primarily funded by out-of-state oil companies, Prop 23 would have rolled back California's landmark Global Warming Solutions Act of 2006 requiring the State to reduce greenhouse gas emissions to 1990 levels by 2020 and a 80% reduction over 1990 emissions by 2050. The first fundraiser held at the then unfinished home was against Proposition 23.

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1. Purpose, Definitions & Background, Living Room

The goals of our project, and the background that goes with it.

1.1 Purpose, Living Room

What is the purpose of the home?

Project Green Home (PGH), located in Palo Alto, California, less than three blocks from Stanford University campus, is a single family dwelling of approximately 2,400 square feet completed in June 2011. The home:

- Meets (and exceeds) the State's residential 2020 zero net energy requirements now;
- Meets the Passive House standard, surpassing LEED platinum and California's Title-24;
- Integrates both cutting edge and available energy efficiency technologies;
- Incorporates the best, cheapest, longest-lasting, safest, most aesthetically pleasing product and materials available;
- Serves as a model and showcase for green/energy efficient building technologies;
- Meets California's Assembly Bill 32 requirement for 80% greenhouse gas emission reduction by 2050, right now;
- Created more "green jobs" in the construction industry versus incremental additional jobs in the fossil fuel industry.

As a working model of the possible, Project Green Home hopes to serve as a real-life replicable example, creating a virtuous circle of similar sustainable housing. As such we welcome the involvement of the community and, in particular, students in evaluating the home against the above design parameters, and likewise media coverage to publicize the possibilities.

1.2 Leadership in Energy & Environmental Design, Living Room

LEED is a rating scale for "green" homes; we aim to well surpass their Platinum rating

Leadership in Energy & Environmental Design (LEED) is an internationally recognized green building certification/numerical rating system, providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. To verify that the house is achieving the highest standards of green and sustainable design the project received the highest ranking, Platinum certification in the LEED for Homes rating system. This system covers every aspect of home construction, from integrated design; the use of materials, energy and water; the building's interaction with the surrounding community; and the quality and health of the indoor environment.

For a house our size and our climate, the difference between each of the LEED rankings (Certified, Silver, Gold and Platinum) as noted in the table below, is 15 points. We call our

house "Beyond Platinum LEED," as PGH received a LEED score of 109 which is 22 points above Platinum and 46% greater than the delta between each of the rankings.

LEED Potential Ratings for Project Green Home:

Certified	***Silver***	***Gold***	***Platinum***	***PGH***
42	*57*	*72*	*87*	*109*

The LEED Certification and backup documentation is found in Appendix 1

1.3 Zero Net Energy Building (ZNE), Living Room

A Zero Net Energy Building generates as much energy, on-site, as it uses.

In California, ZNE is defined as the amount of energy provided by on-site renewable energy sources is equal to the amount of energy used by the building. In essence, this means that the amount of externally generated electricity, natural gas or other energy stock used at the home must be equal to the energy generated by the home. This will be the 2020 standard for all new California residential construction. Depending on the location of the home, this can be accomplished by installing and operating photovoltaic (PV) systems (most common) but wind generation systems, small-scale hydropower and other on-site renewables are also options.

To meet the state's ZNE goals, we installed a 5.9kW photovoltaic (PV) system to self-generate our electricity. This not only covers the annual house energy use but also 8,000 miles (2,000kWh) of electric car use.

The ZNE Certification Documentation is found in Appendix 2

1.4 Passive House, Living Room

Careful construction regulates the temperature of the house naturally, to save energy.

Passive House (***Passivhaus*** in German) refers to the rigorous, voluntary, *Passivhaus* standard for energy efficiency in buildings. It results in ultra-low energy buildings that require little energy for space heating or cooling. Passive design is not the attachment or supplement of architectural design, but an integrated design process with the architectural design. In the United States, a house built to the Passive House standard results in a building that requires space heating energy of 1 BTU per square foot per heating degree day, compared with about 5 to 15 BTUs per square foot per heating degree day for a similar building built to meet the California 2003 Model Energy Efficiency Code. This is between 75-95% less energy for space heating and cooling than current new buildings that meet today's US energy efficiency codes.

At present, essentially three components are needed to meet the Passive House standards: First, minimizing heat loss via insulation and building an airtight structure. Second, the

home uses sunlight as its primary heat source in the winter. Third, in winter the heat in the air stream exiting the building is used to heat the incoming fresh air and vice versa in the summer time.

To be certified as a Passive House, there are three quantifiable standards that need to be met along with the results from Project Green Home (PGH) testing.

	Passive House reqirement	Project Green Home result
Annual space heating or cooling demand (site energy)	≤ 4.75 kBTU/sq. ft. (≤ 15 kWh/m^2)	3.94 kBTU/sq.ft. heating 0 kBTU/sq.ft. cooling
Annual total energy demand (source energy)	≤ 38.0 kBTU/sq.ft. (≤ 120 kWh/m^2)	26.6 kBTU/sq.ft.
Air tightness	0.60 ACH_{50}	0.55 ACH_{50}

As a result, this objective has been met and likewise brings all the benefits of a Passive House. The Passive House Certification Documentation is found in Appendix 3

1.5 Home Background, Living Room

Who we and the team are and the vision

Start with a family in Palo Alto desiring to change the world for the better with a focus on climate change and energy/water use. Add Arkin Tilt Architects and Josh Moore, our Project Manager, and a common vision is born. Combine this vision with a 7,500 square foot lot in Palo Alto, with a very small termite-ridden house constructed in approximately 1918. Deconstruct this structure (simultaneously recovering all the useable materials) and build a house that meets the above design parameters with the features detailed in Section 2.

2 Features

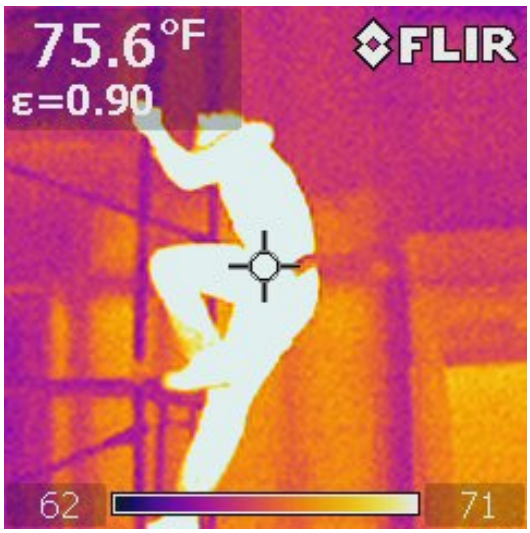
2.1 Design

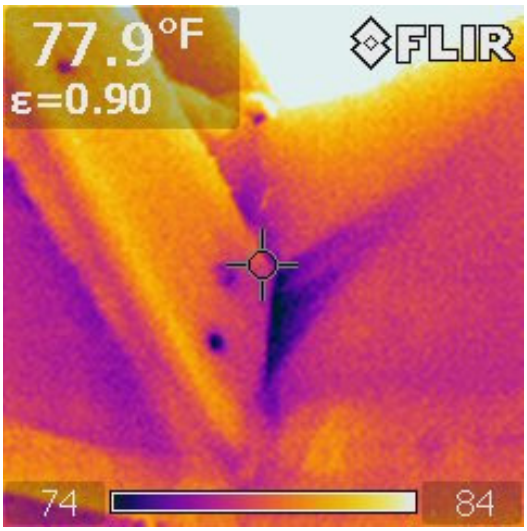
2.1.1 Airtight Construction, Sophia's Bedroom

Air tightness testing

There are three components to the Passive House standard. The first is that the house should be airtight and well insulated, so that heat is not transferred through the building membrane. Our walls were tested using an infrared camera, to show where air was seeping in. On the left is a picture taken to demonstrate the use of the camera to show heat. The picture on the right shows a plume of cold air, coming in around the edges of a beam, which (intentionally) punctures the building exterior membrane. This evaluation procedure was the brilliant idea of Josh Moore our Project Manager. Insulation is covered in section 2.2 as there are so many different insulation types used in the house.

The house is essentially a box. To make the structure airtight, the builder had to focus on three primary areas: Where the ground floor wall meets the slab, all window and door openings, and along the roof edge where numerous rafter tails poke through the air-tight envelope had to be sealed along every edge.

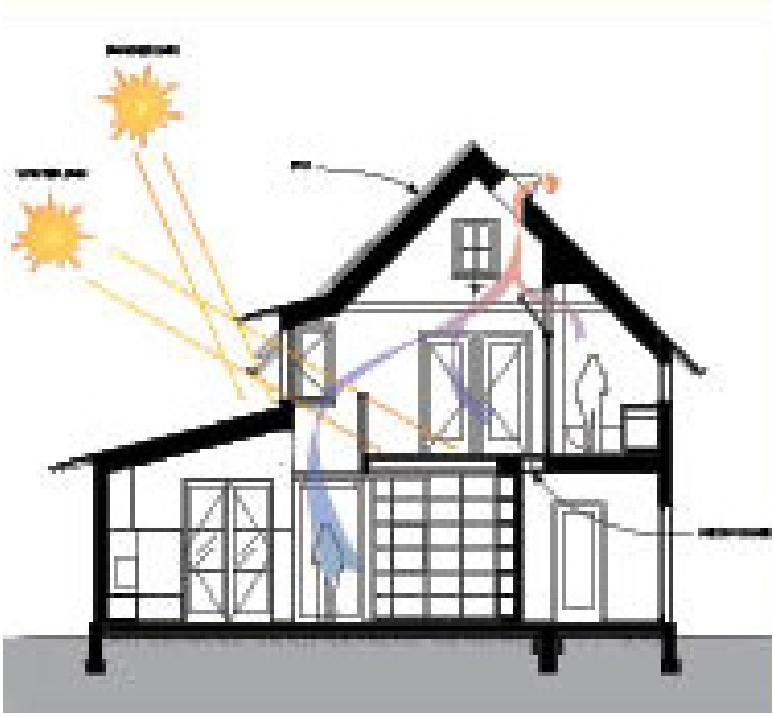




2.1.2 Passive Solar Design, Sophia's Bedroom

Using sunlight to provide ~60% of the heating requirements.

The second component of the Passive House standard is that it uses sunlight as its primary heater in the winter. Most of the windows face south, and the main living spaces are on the south side of the house. Bathrooms, storage, and staircase-parts of the house where less time is spent-are generally located on the north side. Solar heat is estimated to provide 60% of the annual space heating needs, and heat from occupants and appliances inside the house provides another ~15%, according to a simulation in the Passive House Planning Package (PHPP) software used. In addition to the relative inexpensiveness and reduced energy consumption, solar heating inherently does not create greenhouse gases, which also helps to reduce the effects of global warming.



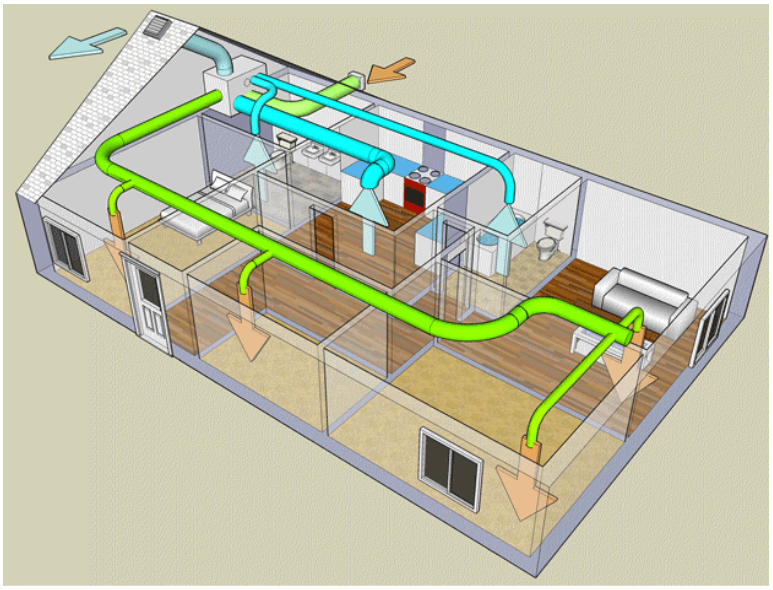
In passive solar heating, warm collected by certain areas of the house is circulated throughout the rooms to generate heating. Usually, large hard surfaces, such as a wall or floor that has been darkened, will absorb sunlight in the form of heat. In our case, the dark concrete floor is the home's primary thermal mass. This stores and gradually releases the heat through conduction, convection, and radiation processes. The overall architecture of the building, as well as the climate and location, also influence the overall ease and success of heat flow.

Outdoor living spaces are integrated on the south side of the house where they connect directly to the main rooms. These outdoor spaces tend to be comfortable for most of the year, shaded by trellises.

It's important to note that the heating (and cooling) needs were based on a computer model. After more than two years of living in the home, we find that overall it is quite comfortable.

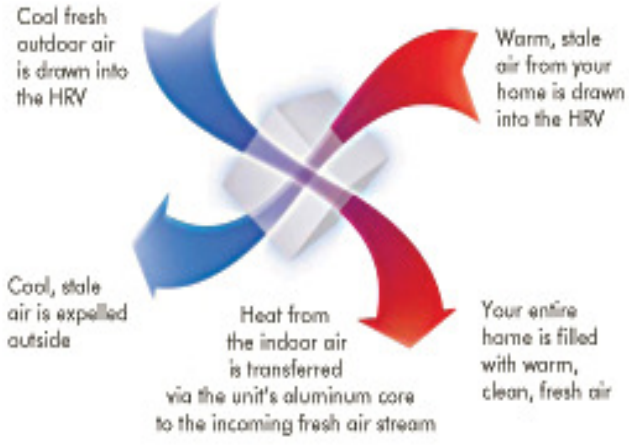
2.1.3Filtered Fresh Air & Heat Recovery, Sophia's Bedroom

Air is recirculated, so that it stays fresh with closed windows in cold months.



The third Passive House component is ensuring a solid supply of fresh air while still meeting the energy efficiency requirements. Here, the house gets fresh air on-demand from a filtered ventilation system located in the attic. Specifically, the heat-recovery ventilation (HRV) equipment pulls a continuous exhaust of stale air from the bathrooms and kitchen, and "harvests" the heat before expelling the air to the outdoors. Simultaneously, outside air is filtered and absorbs heat from the exhaust air via a waffle-grid heat exchanger before being distributed to bedrooms and living rooms. The incoming and outgoing air streams never mix.

In addition to the energy recovery, the HRV also filters the air. Minimum Efficiency Reporting Value (MERV) is a rating system for air filters. The HRV uses a MERV 9 filter, which is suitable for hospital laboratories and filters ≥90% of particulates from the air. The volume is relatively low (80-150 cubic feet per minute), so small ductwork is used (4-6" round, rigid metal). Most of the ductwork is in a chase between floors. Despite the energy needed to run the fan, the HRV creates a net energy savings for the house, and superior indoor air quality.



After two years of operation, we find that we should have used larger diameter pipes. This would have reduced the noise and ongoing energy use by the fan. While we have not measured the noise level in the house, we do notice the "white-noise" caused by the system. In actuality, the HRV may or may not be noisy, in that the house is extremely well insulated and sealed which limits outside noise and may make low-level noise more noticeable.

In addition, since the installation of the unit, we have found similar units that are capable of bypassing the heat–exchanger. This is important as, in our Northern California climate, we have hot days and cool nights. In the summer, should we forget to close the windows in the morning (or those in the upper floor), which causes the upstairs to get hot by the end of the

day, the feature to simultaneously quickly pull hot air out of the home and dump cool air in would have been beneficial.

If you are considering such a system, please do contact Sven Thesen for more information regarding a whole host of issues that could have been avoided.

Venmar EKO 1.5, VenMar.ca , installed by Bayside Mechanical, BaysideMech.com

2.1.42x8 Studs at 24" Spacing, Genevieve's Bedroom

Optimizing structural members limits thermal bridging and saves trees.

Advanced Framing or Optimum Value Engineered (OVE) framing is a system that uses wood only where it is necessary structurally. American builders trying to conserve limited resources in the past centuries used a similar framing system. Today, OVE framing typically uses 2x6 studs (5-1/2" thick) at 24" spacing, with less superfluous wood around windows and doors, and at the top and bottom of walls.

Since wood conducts heat much faster than insulation, reducing wood in the walls saves heating and cooling energy. In this house, 2x8 studs (7-1/4") are "balloon framed" over two stories, running from slab to roof, to reduce joints and connections at the intermediate floor. This also makes the house stronger against wind and earthquakes. We are looking for a student to determine if the 2x8 wood use 1) Reduces overall lumber use and 2) Given that a 2x8 requires a larger tree than a 2x6 (or 2x4), it is the appropriate ecological choice.

Do note that framing with this system takes significantly more detailed drawings and more coordination between builder, architect, and structural engineer. Most builder-architect-engineer teams have never framed this way, and the learning curve is steep and expensive due to the additional time required "to get it right." In our case, our first builder charged an additional $5,000 for this framing style. However, it is not clear if the first builder saved any monies in reduced material costs

2.1.5Air Admittance Valves (AAVs), Children's Bathroom

Reduces need for membrane punctures and plumbing piping.

An AAV is a durable, one-way air valve, the size of a large vitamin bottle. It takes the place of a traditional plumbing vent through the roof. The purpose of both the traditional vent and the AAV is to admit relief air into the plumbing system when water is draining, in order to prevent a vacuum in the pipes that would suck water out of the P-traps under faucets. Typical houses have many vents breaking the integrity of the roof, acting as thermal bridges, and circulating outdoor air within the walls. This house has one such vent--the rest are AAVs. AAVs require less plumbing material and labor, and less roof work than conventional vents. When they are enclosed in a wall, AAVs require an access panel for inspection. At present, Palo Alto does not allow AAVs. To waive the prescriptive building code and allow the AAVs, the design team had to submit a formal request including significant documentation to the City of Palo Alto. The request was approved. Full Palo Alto approval documentation is located on ProjectGreenHome.org/features Sure-Vent, Oatey.com

2.1.6White Metal Roof, Upstairs Open Space

Light colored roof reflects more solar heat, instead of absorbing it.

A "White Roof" is not necessarily white, but is a light color so that it reflects more sunlight, keeping the house cool, and reflecting more light into space. A dark colored roof absorbs more light, and converts it to heat energy. For example, a roof that is true black heats up by 90 degrees Fahrenheit in direct sunlight, while a true white roof heats up by only 14.6 degrees. This light absorbed by a dark colored roof is transferred into heat, and contributes directly to global warming. The light-colored roof also decreases the temperature inside of the building, which reduces energy use associated with cooling the building. However, there is incremental increased energy use in the winter compared to a darker roof.

The Palo Alto Planning Department was concerned about the aesthetic effect of glare on our neighborhood, so we are using a light grey, metallic color that is almost as reflective. Our roof's reflectivity is 58%, while the white option we had available is 63.3%. Because our roof insulation is so thick, the grey roof will have minimal impacts on heating the house in the summer time, and should save a small amount of energy on heating in the winter. The only drawback of the grey roof (versus the white roof) is from a climate perspective: over the course of a year a little more heat is absorbed from sunlight, and will be released

into the air outside the house.

Note, white roofs are speculated to be effective only in warmer climates. Research is currently being conducted to determine if white roofs can save energy in all kinds of climates instead of simply warmer areas such as Palo Alto. For example, it may make sense for a roof to be reflective in the warmer seasons and then darker in the colder months.

In addition to the above, the metal roof was selected over a conventional tile or asphalt shingle tile roof based on a number of factors including aesthetics, (what is understood to be) low embodied energy, long lifetime and ease of recyclability. Asphalt and tile roofs have a sun reflectance of 25%-35%, which is significantly lower than that of metal, which has a 60-70% reflectance. As discussed above, higher reflectance absorbs less sunlight and heat energy, which will decrease the amount of heat energy present to increase the surface temperature of the Earth. In addition, our metal roof has a 40+ year warrantee versus asphalt shingles, which are on the order of fifteen to twenty. Asphalt roofing is also non-recyclable, which further increases the associated embodied pollution and waste. Though the upfront cost of asphalt shingles tend to be cheaper, in the long run, we believe metal roofs are more effective and energy efficient. ccsmr.com

2.1.7 Skylight Passive Ventilation, Upstairs Open Space

Open skylights create a thermal stack pulling cold air up from the ground floor.

Three electrically-operated skylights near the ridge of the roof are located to passively ventilate the house. Air moves freely past the upstairs mezzanine balcony/ open space and stairwell, and the height difference of 20+ feet above the ground slab ensures a strong stack effect, or updraft created by the buoyancy of warm air released from a high opening. Because the house does not have a "smart" heating and cooling system, we leave the skylights open in the summer and then close them once we initiate the radiant floor heating system. Without measurements, it is difficult to determine the efficacy of the skylights..

2.1.8 Active Ventilation, Ceiling Fan, Upstairs Open Space

Ceiling fan assists in moving warm air back down in winter & moving warm air out of house in summer &.

The mezzanine/ open space ceiling fan assists in moving warm air back to the inhabited spaces during winter. In summer, turning the fan in the reverse helps move warm air out the skylights. The switch to operate the fan is a manual switch and it is not clear if the unit can communicate to a remote controller or better "smart" heating and cooling system. Because of the manual operation, to date, we have not used the fan (to assist with either cooling or heating) so its efficacy has not been determined.

2.1.9Daikin Altherma heat pump water heater, Upstairs Utility Closet

Heat from the air outside, with technology much like a refrigerator, is more energy efficient.

This electric water heater transfers heat from the outside air into a water storage tank using refrigerant in a vapor-compression cycle, like an air-conditioner in reverse. The so-called "air-source heat pump" creates 3-4 times more heat from the same electricity as a standard electric water heater. The efficiency is comparable to a geothermal heat pump in this climate, but involves no expensive boring or excavation. In essence, the unit harvests and concentrates outside energy – for every one unit of energy we put into the unit, we get 3-4 units of heat out.

The Altherma costs more than a conventional water heater, but for a zero net energy project, the Altherma costs less upfront to save electricity than the photovoltaic panels (PV) that would be necessary to generate that electricity.

After two years of operation, we are surprised at how much heat is generated by the unit located in the mechanical closet and how warm/hot this closet is. Making lemonade out of lemons, that is, taking advantage of this waste heat, we use this room to dry shoes in, and it's also where the homemade yogurt goes to ferment and the bread to rise.

We are looking for a student to calculate how efficient this unit is, in comparing the winter electrical loading to that of our natural gas use at the rental home (same size) we were in prior to moving into PGH.

JTGMuir.com, installed by Bayside Mechanical, BaysideMech.com

2.1.10 Radiant Floor Heating, Living Room

More efficient thermal transfer reduces energy needs.

A variable-speed pump circulates warm water through tubing in the ground floor slab for winter comfort. Because of the large surface area, radiant slabs can deliver heat using lukewarm water (90ºF), compared to other water-based heating equipment such as radiators and baseboards (160ºF). The lower temperature improves efficiency at the heat source, allows the use of future solar-hot-water for space heating, and allows the use of an electric water heater (the Daikin Altherma) that would be less efficient at higher delivery temperatures.

A conventional slab with tubing everywhere, running at full output, would be barely warm enough to feel, because so little heat is needed to maintain a warm room temperature. Because heat delivered is proportional to (water temperature) x (surface area), we had to greatly reduce the surface area of tubing in this house to keep the water temperature warm enough to feel.

Hot water tubing was placed where the noticeable warmth would be most comfortable and social: the dining room table, the kitchen, the bathrooms, and walking paths around the ground floor.

After two years of use, we find the north side spare bedroom does not get as warm as the main ground floor as this room inherently does not capture the sun like the main floor does. As both rooms are on the same piping system, both areas get the same amount of heat from the radiant floor system per square foot. Additional warming for this room would have required either additional radiant pipes, closer together than those in main floor or a separate set of piping and temperature control for this room.
Bayside Mechanical, BaysideMech.com

2.1.11 Gas Fire Place, Living Room

The gas fireplace is our acceptance of, and nod to, our Neanderthal past, in that we occasionally like watching the flames flicker. In selecting the fireplace we had significant difficulties finding a small enough unit (<10,000 BTU), else we would roast inside. It will be interesting to see over the next winter how many times we actually do use it. This is the only natural gas powered device in the home.

2.1.12 Post & Beam Interior Designed for Remodeling, Library

Interior walls are not load bearing, so they can be remodeled easily.

The exterior shell of the house is largely self-supporting, and the interior is post-and-beam construction. Most of the interior walls are non-load-bearing, so they do not need a lot of structural wood, and they can be rearranged in the future should the family's needs change. We also put hot and cold water lines plus an associated drain and 20v wiring in the wall between the library and study should at some point we or a new owner wish to add a kitchen or move the kitchen to the back of the house.

2.1.13 Aging-In-Place or Extended Family, Study

Flexible space to use in many different ways, as family changes and grows.

The house has five bedrooms, including a ground floor suite with its own outside door that can accommodate an elderly relative, an au pair, elderly homeowners, or a young couple with a child. This bedroom and bathroom configuration strives to provide extended-family living, and flexible space for many future situations. To fully accommodate this, we also installed hot and cold water lines, a drain and 220v to the back area of the house, in case of an additional kitchen or relocated kitchen.

2.2 Insulation

2.2.1Insulation Rating System/ Standard, Genevieve's Room

Insulation is one of the three keys to meeting the Passive House standard. While the house gets most of its winter heating from sunlight, there is still some energy spent to generate heat, and good insulation is required to conserve that heat as efficiently as possible. Insulation should also be combined with airtight construction in areas such as windows and doors to effectively reduce heat loss throughout the house.

The ability to insulate is termed the R-value, which essentially means the resistance to heat flow. The higher the R-value, the greater the insulating power. For insulation, the higher the R value the better, because a material with a lower R-value allows more heat to pass through (heat flow) under the same temperature conditions.

In California, houses are required to have walls with a minimum R-value of 13 to 21, depending on the climate zone in which they are located; Project Green Home's walls are required to have an R-13 value and actually have values of R-24 (second floor) and R-28 (first floor).

A summary chart noting California residential insulation levels over time follows:

Insulation, R	*1970's*	*2008, Title 24*	*PGH*
Walls	R-15 If insulated	R-15	R-28, 1st floor R-24, 2nd floor
Ceiling/Roof	R-15 If insulated	R-30	R-45
Windows	R-1	R-3 Center of glass	R-7 Center of glass
Floor Slab	None	R-15 If heated	R-18

2.2.2Wall and Ceiling Insulation, Genevieve's Room

A Pro-Pink Complete Blown-In Wall System by Owens Corning was used to "super insulate" this home. Fiberglass was selected over a variety of other insulation products due to its

high R-value, light weight, high-recycled content and affordable overall price compared to other insulation systems. Not only does this degree of insulation keep the house warm in winter and cool in summer, but it also significantly reduces noise transfer from the outside and also from room to room.

Cellulose insulation was a competing option, but fiberglass has slightly higher claimed R-value, at half the density of cellulose. Lower density helps with sheetrock installation over the roof rafters; the fiberglass will not sag in its netting as much as cellulose would have. The only drawback to fiberglass insulation is the higher embodied energy (the energy used to create the material is approximately 10 times as much). Cellulose requires the least amount of energy to manufacture out of all types of insulation, for it uses recycled paper. In addition, cellulose waste can be recycled or decomposed whereas fiberglass waste is typically landfilled. However, because of the added energy savings of fiberglass, the total energy cost is eventually lower than cellulose roughly after 1 year.

The Pro-Pink Complete Blown-In Wall System is a two-step process. First, a fiberglass mesh blanket fabric is stapled to the faces of the 2x8 studs and then the L77 loose fill fiberglass is blown in, yielding an R-Value of R28. This compares to a typical fiberglass batt and blown in cellulose both yielding R-values of 25, assuming 2x8 studs. The blown-in system itself works better than other methods of installing fiberglass insulation because it keeps the insulation dry and avoids moisture that could reduce the fiberglass R-value. The loose-fill fiberglass itself was created from glass that has been molten and spun or blown into smaller fibers.

Sprayed polyurethane foam (SPF) insulation was not used for several reasons:

1) While SPF has a higher R-value per inch of thickness than other types of insulation, the blowing agents currently used have global warming potentials (GWP) far in excess of CO2. It would take decades of avoided emissions while operating this zero net energy house just to offset the GWP emissions from installation.
2) Although SPF is inherently air and vapor-impermeable, this is unnecessary, since the house uses the exterior plywood sheathing as the air barrier. Air barrier flaws at the sheathing layer are easier to diagnose and repair. Vapor-impermeable materials in this mild climate prevent the free diffusion of moisture, which may damage assemblies over time. Water-blown, open-cell SPF does not have these issues, but its R-value is no better than cellulose or fiberglass.
3) Foam insulation costs more than cellulose or fiberglass.
4) Walls and ceilings with loose-fill insulation will be easier to open and reconfigure during future remodeling. Ease of remodeling is essential to extending the usefulness of a building.

2.2.3 Unvented Roof (Full Cavity insulation), Genevieve's Room

The entire shell of this house has full-cavity insulation. The attic is usable, conditioned space, and there is no outside air vented between the rafters as with a typical home. Currently, the California Building Code requires rafter venting to prevent potential condensation damage in roof cavities. Condensation forms in roof cavities when a steady

stream of humid interior air enters the roof cavity through air leaks, and the top of the roof remains cold for long periods of time. This house is so well sealed against drafts that there is no supply of humid air, and the roof sheathing is insulated from above with 1" of rigid polyisocyanurate ("polyiso") board. To waive the requirement for rafter venting and allow the modern roof assembly, the design team had to submit a formal request including significant documentation to the City of Palo Alto. The request was approved. BuildingScience.com

2.2.4 Insulated Header, Genevieve's Room

A header is the structural member spanning over an opening in a wall. Headers are typically solid wood and occupy the entire thickness of the wall, creating a significant thermal bridge. Headers in this house are 3-1/2" thick engineered lumber, set to the inside of the 7-1/4" wall, with 3-3/4" of expanded polystyrene (EPS) insulating the header from outside temperatures. EPS (white and crumbly) is the eco-friendliest of the rigid, plastic foam insulations. White Cap Construction Supply, San Leandro.

2.2.5 Floor Insulation, Ground Guestroom

Expanded PolyStyrene insulation was also used under the concrete slab. The slab was poured into a continuous "bathtub" of four-inch Type II EPS insulation that wraps up the sides to connect with the walls. This keeps the slab close to room temperature, even without the radiant heat activated. In addition to improving comfort, slab insulation greatly improves the home's energy balance. Slab insulation can never be retrofit, so insulating properly was important. Four-inch thick EPS sheets facilitate installation since they are less breakable than thinner sheets commonly used. Further, scraps of this thick material were used to insulate headers and wall cavities.

2.3 Electrical Energy

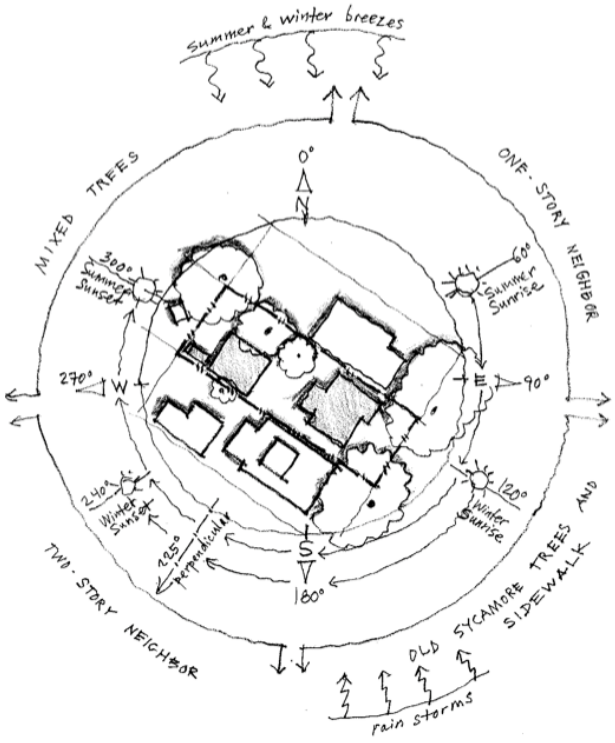
2.3.1 Electricity & Electrical Wiring, Sophia's Room

Minimizing wiring holes in the exterior membrane.

To keep the home as airtight as possible, the wiring configuration minimizes punctures in the exterior plywood sheathing. To accomplish this feat, the majority of outdoor wiring (serving the outside lighting, gray water pump, electric vehicle charging system) is addressed by an outside electrical panel. Further, as noted by the pictures, cuts through the outer wall have been made with the smallest hole that would allow the wiring through and sealed from the inside. A typical cut is on the right.

2.3.2 Photovoltaic System, Master Bedroom

Just a fancy word for solar panels.



A 5.9 kW photovoltaic (PV) system including locally designed micro inverters was installed on the west side of the home in March 2013. The system size is designed to cover the entire energy load of the house plus that of an electric car driving ~8000 miles per year. Based on system cost and projected generation over 25 years, electricity should be on the order of 7¢/kWh, this is compared to the current Palo Alto price of 16¢/kWh.

We endeavored to minimize the number of PV panels (that is the cost) required to achieve our zero net energy goal by locating the house as far back from the street trees as the City of Palo Alto would allow. This explains why we have the front covered porch and associated timber structure, this "front" is in alignment with all the other homes on the street while the body of the house sits ~8 feet back. Further, the roof slope conforms to the City of Palo Alto's "Daylight Plane" requirements, which minimize the house's shade on neighbors. Despite Planning Department constraints, annual PV generation from this roof is within 1% of that from a theoretically ideal slope and orientation, according to the PVWatts online calculator.

PVwatts.org

Further, we waited more than a year to install the system to determine actual electricity use and hence the PV system size needed. With this all-electric house, (heating, cooling, range, hot water, etc) we use roughly ~12 kWh/ day in the summer and ~22 kWh in the winter. In addition, we included electricity for an electric car at 4 miles per kWh and ~8,000 miles per year.

In late 2010, we reserved our spot in the Palo Alto PV rebate program at $1.4/watt. As such, we encourage those interested in PV to reserve a place in the program ASAP for the rebates are based on a tiered system – the sooner one signs up, the larger the rebate. For example the October 2012 rebate was $1.2/watt. Likewise, knowing that we were going to install PV, we included a ¾" EMT conduit from the roof to just next to the main breaker as part of the home construction. This was done to reduce installation cost of future PV and as a tradeoff between exterior wall punctures and exterior aesthetics.

In attempting to make the house "Solar Ready, " we made at least 3 mistakes. 1) We used a main circuit panel (the one that sits on the outside of the house) that positions the main house breaker at the top of the panel as opposed to one-third of the way down, 2) We should have marked the conduit as carrying electricity (Palo Alto has specific language for the signage) and had this piping inspected by the city before the sheetrock and insulation covered it up and 3) The conduit carrying the wires from the rooftop PV should have exited the house further from the main breaker panel.

As part of our community educational efforts, we partnered with Palo Alto Utility and Horizon Energy and held a "All you wanted to know about Residential Solar Energy But were Afraid to Ask" evening seminar at our local elementary school which was attended by ~12 families. PV Installer: Horizon Energy, gosolarnow.com

2.3.3CAT6/Data Wiring, Desk Nook

We decided that data wiring isn't really necessary, with wireless connection.

We did not wire the house with CAT6 or other data wiring (except for phone jacks and cable) with the assumption that the future is wireless and will communicate via ZigBee or Powerline Carrier. In 2008 and 2009, and after touring numbers of houses that were wired with CAT6, this was a serious question. After two years of living in the house, this lack of wiring has not been a problem. However, what we still need to do is work out the sound system – if anyone has an interest in this project, please contact Sven.

2.3.4Energy Monitoring System, Laundry Room

The central control panel for the PV, plus some additional monitors.

Our advice: Depending on your personality, it may be better to hire an energy efficiency company to do a winter and summer energy snap shot. On the other hand, you could integrate your smart meter with your photovoltaic generation feed to determine live energy use. If you decide to measure live usage, ensure there is room inside and outside the breaker panel(s), and be prepared to spend several thousand dollars on monitoring equipment, and also install a simple roll type counter on the electric vehicle charging equipment. (If others charge their car at your house, it's quick and easy to know how much electricity they used.)

PGH Background: Initially, the thought was to use some form of whole house TED or TED like energy monitoring system to provide live data on 1) overall energy use, 2) that of a few large appliances (water heater, stove, EV chargers) and 3) photovoltaic generation. However, we have decided against this given the cost of a TED system combined with the need to build a stand or shelf abutting from just below the main indoors breaker panel to house the TED monitoring equipment plus same for the exterior breaker panel. If you are looking to do this level of live monitoring, understand 1) the up front costs ($2k+ for our house); 2) likewise that you, your architect and electrician understand the necessary equipment needed and the associated space both inside and outside the breaker panel and 3) how to integrate multiple breaker panels. (For example our internal panel handles the inside electrics including the inside component of the 220v heat pump while the exterior panel handles the main feed from the city, the electric car chargers, and the exterior component of the 220v heat pump. Hence to accurately measure the heat pump, we need to operate two TED type systems, one at each breaker panel.

Instead, the non-profit Acterra*, as part of their energy audit services, provided a Blue Line Innovation Energy Monitor which reads the external utility meter (the classic spinning meter) and provides live data on the overall energy use (or generation if its spinning backwards) to a easily readable monitor inside the house. However this device was less than perfect in reading Palo Alto's old style spinning meter and/or in the data

transmittal to the indoor monitor and has been removed.

In addition, the photovoltaic system has its own website noting instantaneous generation plus daily, weekly, etc generation. Once we get a smart meter from the Palo Alto Utility (we are part of a pilot program for the city utility to evaluate the various smart meters) we hope to integrate the PV generation data with the city data.

As for the past year's energy use, utility bills indicate that we use ~12 kWh/ day in the summer and ~24 kWh/ day in the winter. This doubling in energy use is due to primarily the heating needs of the house (see Sections 2.1.8 & 2.1.9 discussing the radiant floor heating system) combined with additional electric dryer use (in the summer we mainly use a clothes line). These numbers are pre- electric car charger installation.

We have also measured a number of the 110v appliances with Kill-A-Watt meters. For example, the Heat Recovery and Ventilation system uses 40w; to wash a load of laundry takes 0.1kWh versus the dishwasher which is 1 kWh per load (it uses a built in water heater in the cleaning cycle). The Acterra Audit examined other 110v loads and identified a number of minor vampire loads such as the microwave. Vampire loads refer to appliance electrical use even when the appliance is off but not unplugged) We were pleased to find out that the flat screen TV, a 2012 purchase, has no vampire load.

Kate Latham, an energy consultant with WattzON.com has also volunteered to do a detailed examination of the 220v loads in the next several months.

*As part of Acterra's energy audit they provide & install the Blue Line Innovation Energy Monitor for free to houses that use more than 10kWh/day

2.4 Illumination

2.4.1 Daylighting, Study

More light from outside means less light from electricity.

Within the constraints of the Palo Alto City Planning regulations, the lot size, and surrounding trees and structures, we have attempted to bring daylight into the house to maximize livability and to reduce the need for electric lighting. The large dormer over the loft illuminates the central space. The open stairwell is lit from above by operable skylights. The master bathroom is also lit by a skylight. Most rooms have light from at least two sides to balance the color and quantity of daylight.

2.4.2 Electric Lighting, Guest Bedrooms

LED lights and compact fluorescents save significantly over incandescent bulbs.

The great majority of the lighting is either Light Emitting Diode (LED) or fluorescent. The wall sconce LEDs are made by Phillips and the LED recessed ceiling lights are model LR4 by CREE. The LEDs are incrementally more expensive than standard fluorescent lights, but

the payback on energy savings is rapid. In addition, LED lights are more cost effective than PV panels at reducing household energy drawn from the grid. Finally, compared to fluorescents, LEDs do not contain any mercury or lead and their dimming performance is typically superior.

In specifying the lighting, LED and fluorescent lamp color-temperatures were specified to feel warm and match our expectations of "home."

Compare and contrast the lighting in the downstairs and upstairs guest bedrooms. Include in the evaluation the ability to properly dim the lights, light output, color and noise.

The total lighting energy footprint from the home's approximately 60 different light bulbs was calculated to be just over 1 kW, the equivalent of 10 standard 100-watt incandescent bulbs, or 2, 500W halogen bulbs. The majority of the bulbs have also been scribed with the installation month and year to determine actual operating in-the-field lifetimes. In fact, so far, in the two years of living here we have not had yet had to change a light bulb – anywhere!

2.5 Interesting Materials

2.5.1 Quality Windows, Upstairs Guest Bedroom

Better windows, for better insulation.

We like the windows: their triple pane super seal and insulative qualities, the 2 ways of opening, and their look. They have a modern metal frame (nice colors) on the outside, with warm Scandinavian looking wood on the inside. Our one issue is that they open inward, so selecting appropriate drapes and curtains can be difficult.

About 25% of the windows have screens; some were placed to provide shading (kitchen) and others to prevent mosquitos from entering. As they were not ordered simultaneously with the windows, we went with a local manufacturer. We plan to keep screens on the windows for 3/4 of the year.

In an effort to spur North American manufacturers to improve their products, the house features triple pane windows and multi-panel doors by Sorpetaler from Germany. These units have thicker, stronger, better-insulating glass; better-insulating frames; and seal airtight. These features, combined with the attractive style, render them (sadly, in our opinion) superior to any American manufacturer as of early 2010. Sorpetaler windows are easier to install weather tight in any wall thickness because they can be set within the wall to optimize thermal performance, they permit over-insulation thereby further increasing whole window heat resistivity, and they have a modular aluminum sill and no nail flange. The block frame allows them to be taped airtight to the house. Sorptaler has also been working to reduce its company carbon footprint, which qualifies the company as a more

sustainable choice. It uses wood that has been sustainably harvested from forests throughout Europe and Scandinavia, eliminating a net loss of trees. Also, by our architect's calculations, shipping the windows by sea is less of a carbon footprint than a 500-mile truck ride (in comparison to mid-western US made windows)

The "U-value" indicates the level of heat flow through a window, with lower numbers being better. Typical North American windows (again as of early 20100 have a U-value of about 0.33, the Sorpetaler U-value is less than half, 0.14, and reach as low as 0.09.

To date we are quite happy with the windows and accordion door leading to the front side porch. .sorpetalerusa.com

2.5.2 Concrete Slab, Dining Area

Made with materials often considered waste products, which require less energy to process.

The concrete mix design uses 50% slag and fly ash in place of Portland cement, which reduces the energy needed to make the concrete. Additionally, the slag and fly ash have traditionally been considered waste products. The mix achieves 3000 PSI of compressive strength after 28 days. Star Concrete, San Jose.

Figure 10 Concrete Slab

The rich rust-color of the slab comes from a non-toxic mixture of iron sulfate, which is sold in nurseries as fertilizer. Several months after the slab cured, the owners, architects, and team of helpers mopped several coats of iron sulfate solution onto the slab, then scrubbed and rinsed it to achieve the right surface character. This not only gave us owners a sense of putting elbow grease into our own house, but was a lot of fun as well.

2.5.3 FSC lumber, Dining Area

Forest Stewardship Council lumber.

The majority of the lumber used in this house is either 1) certified by the Forest Stewardship Council (FSC) as originating in a sustainably managed forest. (A competing certification set-up by the wood-products industry, Sustainable Forestry Initiative, offers little real protection for sustainable forest management.) FSCus.org

FSC lumber is more expensive and some sizes are unavailable in some markets. These realities make it more important to conserve wood in the design. (See the Section on Advanced Framing: 2x8 studs at 24" spacing) and using salvaged wood where feasible (which has its own issues such as

potential lead contamination, and ensuring quality and standardization between the same specified type of material.)

2.5.4 The Tree Post, Dining Area

From sustainable logging, and presented to emphasize the connection with nature.

This madrone tree was thinned from a forest in Sonoma County. The upper half of the tree is incorporated into another a beam from a deconstructed house near Healdsburg. Using the un-milled beam brings a consciousness about the nature of building materials. The tree also relates to a traditional Japanese idea about deploying conspicuous materials in a manner that preserves and celebrates the inherent beauty of their unspoiled essence.

The tree is not a load bearing structure (it does not support the beam above) and yes the children have climbed it up to the 2nd floor. Because climbing strips the colorful bark off, please refrain from doing so.

2.5.5 Low-VOC Materials, Master Bedroom

Volatile organic compounds (VOCs) are used as solvents in products that are liquid-applied. Paint thinner is a common VOC. VOCs diffuse as gases to the air over time (off-gassing), creating poor air quality and health risks. Paints chosen for Project Green Home have very low or zero-VOC content; latex paints are one product where better manufacturers have eliminated VOCs. Other products were selected for low VOC levels that meet LEED for Homes criteria for health and safety. Some of these are: primers, clear wood finishes, floor coatings, wood stains, caulks, and adhesives. In general, LEED allows no more than 250 grams VOC per liter of product (less than 150 g/l for paints).

2.5.6 Hardie Plank, Carport

Hardie Plank is a wood fiber and cement composite material we've used for siding. It is extremely durable and dimensionally stable. The planks will last longer and have less environmental impact than other plank sidings.

2.5.7 Living/ Green Roof, Upstairs Open Space – Lost to Photovoltaics

The metal roof over the ground floor pop-out of approximately 220 square feet has a low slope and load bearing capacity of ~40 pounds per square foot which makes it an ideal

candidate for a living roof. We had planned to install a living roof, which would have reduced water run-off, and kept the room warmer in winter and cooler in summer. However, we have to use this area for solar power generation as the Palo Alto Fire Department required us to keep the photovoltaic panels 3 feet from the top roof line. As such, we could not maximize the panel orientation on the upper roof and were required to also install them on this lower roof. It is important to note that not all municipalities have this 3 foot from the roof line requirement.

2.6 Reconstructed and Salvaged Materials

While reusing materials intrinsically makes sense, be aware that there is likely substantial time and money required to bring these pieces to a suitable condition for use. On the other hand, salvaged pieces may also provide a sense of timelessness and add significant aesthetic value. We encourage the use of these materials but also acknowledge that there may be a number of caveats in their use.

2.6.1 Golden Bear Recycled Stone Tile, Living Room

Tiles from mining by-products.

This tile is made from non-toxic "dust" that is a by-product of the mining industry. The color comes from the parent rock, and is integral to the material. It has the hardness of stone, but without pores or microscopic cracks that might stain. The tiles used in this house are a prototype run from Golden Bear Ceramics (GBC). GBC is seeking investment to get the kilns up and running again. Jim Wood, Golden Bear Ceramics in Grass Valley, 530-320-1276.

2.6.2 Salvaged beams, Living Room

Structural timber recycled from previous construction.

Some of the primary structural beams in this house are reclaimed from a Vacaville farm and deconstructed Richmond warehouse. These beams are exposed because the wood is old and beautiful, because we want to tie the house to a long history of building in the Bay Area, and because we want to tell the story of re-use. C&K Salvage in Oakland, (510) 569-2070.

2.6.3 Windows Upstairs Foyer, Upstairs Guest Bedroom

These interior windows were first external windows which we believe were added to the original house during an unpermitted ~1970s expansion. As part of the deconstruction in preparation for building PGH, the windows were saved from the landfill and then cleaned (including removing most of the lead paint). Economically, these "free" windows are likely

an economic toss up due the labor involved in cleaning them. However, in addition to reducing the trash footprint of the deconstruction process, we also avoided the energy production associated with making new windows. Equally importantly, we like the aesthetics of these windows combined with the connection to the original house. Note: these windows should not be reused as exterior windows.

2.6.4Sliding Interior Doors, Living Room

These antique glass doors borrow daylight from adjacent rooms to illuminate the living room/ library area. When they slide over the bookcases, the shelves can still be seen through the glass. The doors don't take up floor space when open, which is important for wide openings. While they do look lovely, preparing them was particularly laborious between stripping the (lead) paint, patching the holes in the woodwork and priming and painting them.

2.6.5Wooden Flooring, Second Floor Hall

In selecting the wood flooring for the upstairs, Kate wanted something that reminded her of her Uncle Ken's wide planked 1700's New England home with its knots and nail marks. We found this in the clear-heart old growth Douglas fir from Stanford's Brown building complex built in 1914 and deconstructed in 2002.

According to Jim Steinmetz of Reusable Lumber Company from a transportation/ processing carbon perspective, the boards traveled under 150 miles from the source – to storage, to mill, to our home – which is 10 times more efficient than the industry average. Likewise the smaller boards came from a variety of homes on the peninsula. By Jim, conceptually, there are approximately 900 pounds of sequestered carbon in these floors.

These floors, while beautiful, have separated in a few places and we have found the wood to be softer than expected – or we are rougher on the wood! There are other sustainable flooring options that would have been equally effective including their aesthetic impacts and at a reduced cost. Finally, the builder (but not the flooring installer) has a real concern that the boards will become loose from the under-flooring in the mid-future.

2.6.6Recovered Redwood Siding, Carport

Originally, the architects specified that the metal roof over the carport would be directly attached to the supporting beams. The roofers objected, as the roof would not hold and suggested placing plywood on the supporting beams and then the metal roof. Given that the plywood (and the manufacturing labels, stamps, instructions etc.) would be exposed to view and its cost, the team identified that recovered siding would accomplish the roofers goals, meet the architect's aesthetic requirements and not consume any new materials. It's important to note that the painted side of the siding faces up (and was not sanded) essentially encapsulating any lead paint. This was probably the best (environmental & cost) use of any salvaged material in the house.

2.6.7Exterior Exposed Wood Siding, Living Room Porch

The exterior wood trim at the kitchen windows and siding at the master bedroom bay is salvaged redwood. Redwood is beautiful, rot-resistant, and will last for decades with minor upkeep. While this salvaged wood was challenging to work with (it splintered), the older wood is of superior quality and adds beauty and character to the house. Do note, as it is exposed to the elements, it does require annual staining to retain its color.

2.6.8Front Fence & Vegetable Bed-Reused Material, Carport

The front fence and the raised vegetable bed in the back are constructed primarily of recovered redwood from demolished 25+ year-old fencing. In that, when we deconstructed the West (left) screening fence between us and the neighbors, we trimmed off the rotten tops and bottoms of the old five-foot long and eight inch wide pickets then cut them to size (3"x36") and planned them. We did the same to the 4x4" posts (as they were redwood, they were not treated with chemicals, etc) In addition to increase the new fence's life, the posts are mounted in metal stirrups, versus being planted in concrete. While the wood (posts and pickets) was free and estimated to be

worth $1,000, the labor in preparing this wood was considerable.

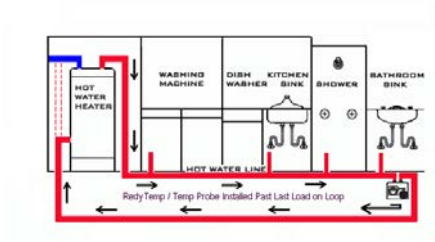
Further, as we needed more material, we recovered additional old fencing that would have otherwise ended up in the landfill from Mike Hampel at Sturdy Fence (650) 969-2844. This includes some very nice 7' 4x6" posts that we intend to use as supports for the children's to-be-constructed tree fort.

2.7 Water and Associated Energy Use

2.7.1 Recirculating Hot Water Line, Master Bathroom

Water is kept hot until needed. No more running the taps until it gets hot.

In a "structured plumbing" design, domestic hot water is plumbed in an insulated loop through the house, like a racetrack, with the water heater as the start/finish line. Water sits in the pipe until an occupant presses a button near a faucet, which activates a pump at the water heater. The pump circulates the loop--water runs through the racetrack--until hot water reaches the tap and the pump shuts off.



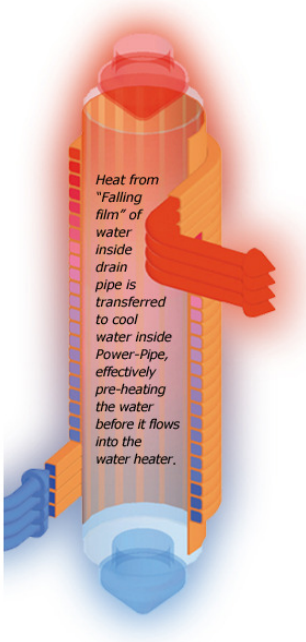
For us, this means there is very little time spent waiting for hot water at the shower. The shower ritual is now to press the button in bathroom, select clothes and by the time this is done (<2 minutes) , there is less than a 10 second wait for hot shower water – without wasting any water. How long is your wait at home?

This system saves both water and energy. Lukewarm water that was in the pipes goes back to the water heater to be reheated, rather than running down the drain while the occupant waits for hot. Since water recirculated inside the house is always warmer than water coming from the underground water main, the water heater consumes less energy bringing it up to temperature. GotHotWater.com

2.7.2Drainwater heat recovery (Powerpipe unit) Downstairs Bathroom

Heat exchanger takes energy from water headed to the sewer and uses it to heat incoming water.

Soapy water that runs down the drain during a shower is still hot, but it usually runs directly to the sewer. Fresh, cold water is then heated to supply the shower. This house, however, uses a Powerpipe heat exchanger to pre-heat the incoming cold water using hot drainwater. A coil of incoming cold water runs in counter-current to the outgoing drainwater, which clings to the copper walls by surface tension and transfers heat. Free heat is reclaimed from the wastewater, taking a big load off the water heater during showers. Renewability.com



2.7.3Toilets, Eco Flush, Childrens & Master Bathrooms

EcoFlush Ultra Low Flow and Urine-Diverting Toilet

We received approval from Palo Alto for a one-year pilot to install and operate two EcoFlush advanced ultra-low-flush (ULF) European toilets. This is the first time these toilets have been formally approved for use in the United States. As illustrated, the toilet has two compartments (solids and urine) which both currently drain to the city's sanitary sewer.

The EcoFlush toilet typically uses as little as 0.04 gallons (7 ounces) when flushing the urine compartment. Compare this to an old style 1.6-gallon (200 ounce) toilet and a modern 0.8/1.6 gallon per flush (100/153 ounce) dual-flush toilet. We find it interesting that people typically urinate anywhere from 5-20+ ounces per pee (a soda can is 12 ounces for reference) and that the typical home flushes with 10x the urine with fresh potable water.

How It Works - The user simply urinates in the front drain and defecates sitting back. The drains are located so that no additional effort is needed. A dual-flush flush button features two parts: one to flush urine and one to flush solids. Each

discharge line has its own trap. While both drains are sent to the city's sanitation plant, we hope to one day route the urine-only drain to the gray water system.

Problems and Solutions - The problems after two years of operation are the occasional 1) "poop on the pee side" as caused by our 7 & 8 year-olds failing to remember to sit at the back of the toilet rather than the front and 2) toilet paper blocking on the pee side due to the kids not putting it at the back. When this occurs, we remove the solids and then flushing the "urine line" with water. As the toilet's urine line drains to the home's blackwater drain and hence to the city sewer, there is minimal contamination risk. We have also posted signs above the toilets to educate guests on how to properly use the toilet, and so far all the blockages have been caused by the children. Note, the toilet vendor offered us a solution – an insert seat that re-centers the toilet seat to the back but we never took her up on it.
ecovita.net/products.

2.7.4 Toilets, Caroma Smart, Downstairs Bathroom

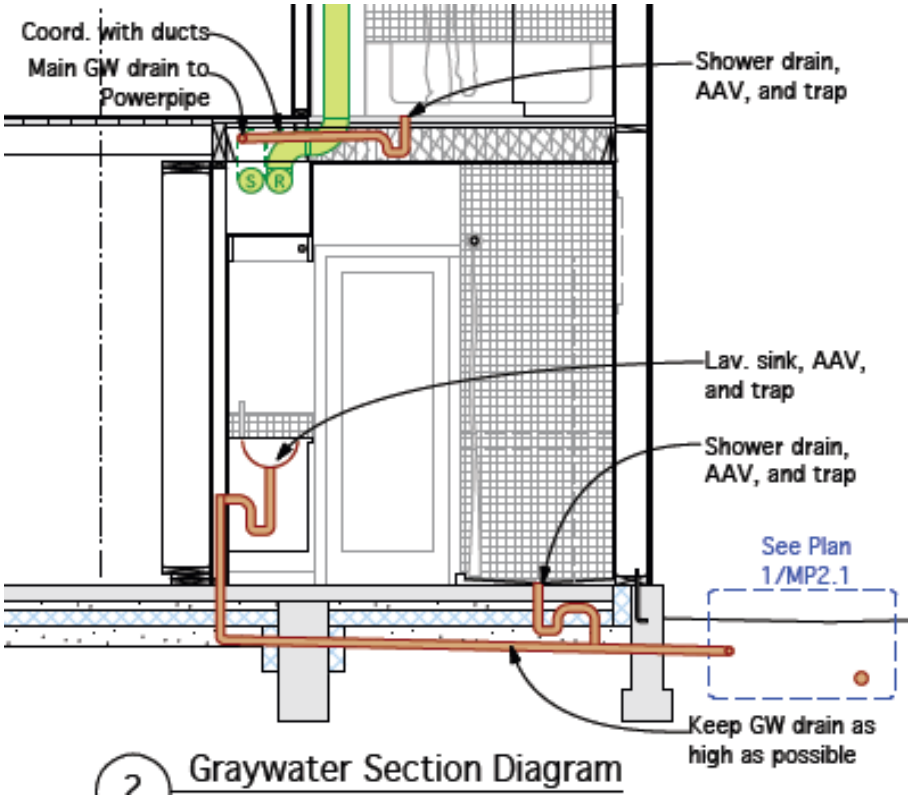
Caroma Smart toilet and hand washstand.

Downstairs we have a Caroma Smart toilet and hand washstand combination. Fresh water is used for hand washing and then flows into the tank to ultimately flush the toilet. It is also has dual flush capabilities at 0.8/ 1.2 gallon per flush. Using the above tank sink to wash one's hands displaces that same quantity of water for use to flush the outgoing waste. In essence it's a mini greywater system. What is interesting is time it takes to fill the toilet tank. The falling water from the top of the facet creates a noticeable noise (at least to most first time guests) which in turn triggers a conversation with the guest on how much water we use to wash away our body waste. *caromausa.com/profile-smart*

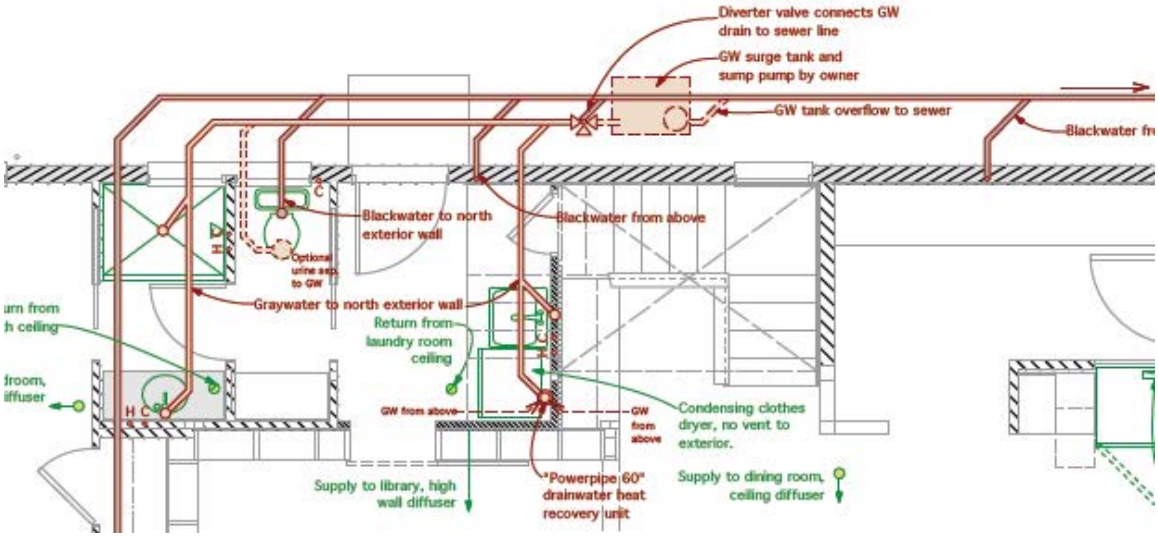
2.7.5 Graywater, Showers, Sinks, Laundry and 1% Urine, Laundry Room

Shower & sink water to water plants.

All the bathroom sinks and showers, plus the laundry and the urine stream from the Eco Flush toilets, have been double plumbed to drain into a future graywater irrigation system. The collection system exits through the slab on the east side of the house and runs to the front yard where it joins into the main black line leading to the street. Once we figure out the specific system, one that couples our greywater generation (estimated to be ~50 to 70 gallons per day) to the water needs of the landscaping, and how to address the Eco-Flush urine stream from we will work with the city to permit some form of graywater irrigation system. It may be an underground system or it maybe a series of ponds, maybe even some form of wetland. We welcome assistance in this area, please contact Sven or Kate if you wish to assist.

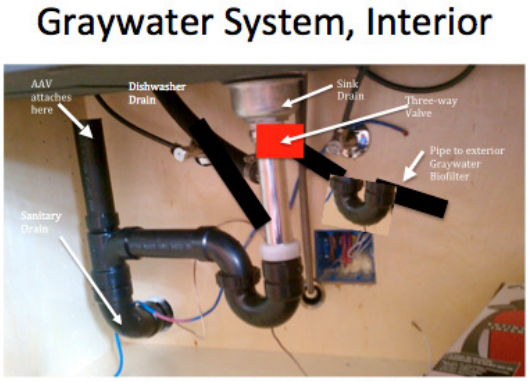


2 Graywater Section Diagram



2.7.6Graywater, Kitchen Sink, Kitchen

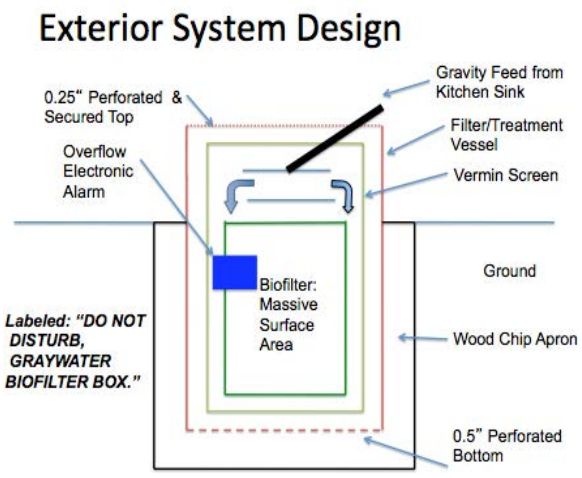
Palo Alto has granted conceptual permit approval for a kitchen sink graywater system. This is needed because the California Graywater Code does not include/ allow kitchen sink in their definition of graywater, because it tends to be relatively high in organic solids and grease, which can prevent water from infiltrating the soil. This will be a pilot program to evaluate use of a biofilter system to treat kitchen sink graywater onsite, which will include monthly evaluations of the system and a report to the city after one year.



Picture 3: Kitchen Sink Plumbing Configuration with Graywater Diversion

Piping labeled: "Graywater Drain, Do Not Drink" or "Sanitary Drain, Do Not Drink" as appropriate.

An average 12 gallons per day of kitchen sink graywater flows down through a 3-way valve, powered by gravity, into an exterior 25 gallon biofilter vessel: a plastic box filled with wood chips, with a perforated top and bottom, situated about 20 inches below ground. Food particles and grease are filtered out by the chips' large surface area and rough edges, as the water percolates into the soil around them. Content left behind on the wood chips is aerobically decomposed by microorganisms.



Since our household is vegetarian, no blood or uncooked meat will enter the system. These can potentially carry pathogens that are a danger to plant life, but those risks are typically eliminated by the aerobic digestion process anyway. To prevent vermin infestation, the interior of the filter vessel will be lined with a stainless steel wire mesh. The system does not connect to the potable water system in any way, so the chance of cross-contamination is effectively zero, as is the chance of surface water contamination.

The goal is to eliminate our household's kitchen sink wastewater flow to the city's wastewater treatment plant, without creating a hazard or nuisance to the neighborhood (flooding, odors, etc). This will reduce treatment costs and greenhouse gas emissions for the city and residences.

2.7.7Low Flow Shower and Sink Faucets, Downstairs Bathroom

Most importantly, the low-flow showers provide an excellent shower with solid pressure and what appears to be a large flow. In fact, we like them more than the high volume shower at the rental we were living in prior to PGH. From an efficiency/ environmental perspective our showers meet EPA's WaterSense standard of less than 2 gallons per minute (gpm) flow and the sink faucets meet EPA's standard of less than 1.5 gpm. This compares to a standard new shower at 2.5 gpm+ and faucets at 2+ gpm. We were pleased to note that the Acterra environmental review plus two other follow up reviews by two different organizations likewise found that the showers do operate at these low flow levels. We win on comfort, plus both our wallet and environment win with the decreased use of energy and water!

2.7.8Rain Water Collection, Backyard

Rainwater from all the roofs (~1,800 square feet) is collected and channeled to the northeastern side of the house (back right). At present it runs via a "rock stream" into a dry well, a large pit lined with a permeable geotextile membrane and filled with 1.5" diameter rocks. Because the rocks do not perfectly fill the pit, the interstitial space can hold roughly 100 gallons of rainwater, and with the large surface area of its bottom and sides, it accelerates rainwater absorption into the soil versus dispersing the water on the surface. Not only is it functional but the rock stream is also was an aesthetic feature in the landscaping. Before the children and chickens covered it up

This is an important feature in that historically, rainwater runoff from roofs, parking lots, etc. has been directed off-property into nearby streams which often leads to significant erosion, damaging the aquatic and riparian ecosystems. Or, potentially worse, the runoff has been directed into the sewer drain. This can lead to flooding at the wastewater treatment plant, causing untreated sewer wastes to flow into the receiving water body. By treating/dispersing all generated rainwater *on-site*, we avoid these problems.

Finally, by directing all of the rainwater to one downspout, we have the potential to collect and use this rainwater for irrigation and/or toilet flushing. However given the ultra low flow toilets, the need for this water is extremely small

and our Mediterranean climate of approximately four wet months followed by eight dry, makes irrigation difficult unless we were to install extremely large tanks - the excavation, soil disposal and installation of which has its own (large) carbon footprint and (large) cost.

2.7.9Permeable Concrete, Front Entrance Porch

Both the small concrete driveway/pad and the front door concrete porch are made from permeable concrete. This enables rainwater to percolate thought the material and into the soils below rather than pooling or running off into a stream or drain as discussed above.

2.8 Kitchen and Appliances

2.8.1Inductive Range/ Stove, Kitchen

This is has turned out to be one of our favorite devices in the house. In summary, the inductive stove has all the benefits of gas (ability to turn up and down extremely quickly) while using half the energy and safer for the user. For example, with an inductive stove, 84% of the energy goes to heat the food versus 75% for a typical electrical stove and only 40% for a gas stove. Because the surface of the cook top is only heated from contact with the vessel, the possibility of burn injury is significantly less than with other cooking methods. Obviously, the induction effect does not heat the air around the vessel, resulting in further energy efficiencies. It works by producing an oscillating magnetic field underneath the pot which induces an electric current in the pot. Current flowing in the metal pot produces resistive heating which heats the food. While the current is large, it is produced by a low voltage. Cooling air is blown through the electronics but emerges only a little warmer than ambient temperature. (Samsung Freestanding Induction Range FTQ307NWG from Sears.).

Inductive ranges are quite popular in Europe, particularly in restaurants as the design inherently produces significantly less waste heat than natural gas. As we like to cook and had never used one before, the architect had to challenge us to try it, to take a risk, and we are very glad that we did. This is another case of a triple (quadruple) win for convenience, comfort, cost and environment!

2.8.2Refrigerator, Kitchen

The house has a conventional refrigerator that is EnergyStar-rated to consume 445 kilowatt-hours annually, one of the most efficient relative to its volume. Because the refrigerator runs continuously for decades, the design team considered using a direct-current refrigerator or superinsulated fridge such as the SunFrost. The high cost of the SunFrost relative to its energy savings means that using a conventional fridge and spending the incremental extra money on photovoltaics is a better conservation bang-for-the-buck strategy.

Given the short distance (~3 blocks) to currently two grocery stores and a conscious decision that as a family we do not need a standard sized fridge, we were challenged by the architect to go with a somewhat smaller fridge/ freezer with 18 cubic feet (the average American fridge for a family of 4 is 19-22 cubic feet.) To date, this has not presented a problem. Samsung model RB195ACPN.

Note, we have had problems with this unit, the drain keeps freezing and causing water to accumulate in the right bottom drawer and the internal thermometer is faulty causing temperatures to be lower in the freezer than what the display reads By the multiple service technicians that have come out and replaced various parts, the cause has nothing to do with the energy efficiency features but a Samsung design problem. We would not get this particular model fridge again. These problems are causing the unit to use ~1.9kWh/day versus the rated 1.3 kWh/day.

Palo Alto also gives a rebate for energy efficient appliances such as this one.

2.8.3Appliances, Sink Garbage Disposal, Kitchen

Given that we are avid composters, we simply opted not to install a garbage disposal. Room has been provided for one underneath the sink and the required electrical connection installed in the off chance that we change our current behavior. We do realize that we have to educate our guests on the composting program to ensure that we don't end up with blocked pipes.

Now that we have chickens, over half of the daily compost goes to them as food and the remainder, egg shells, food contaminated paper products, onion and leek skins, corn husks and the like get composted.

Composting activities at our rental housing have annually produced pumpkins over the years (they grow right out of the compost) and we transported two plants from the rental to the new house and are now in

our 2nd pumpkin generation here.

2.8.4Kitchen Countertops, Kitchen

We selected a Paperstone countertop over Cambria, Silestone, Ceaserstone, concrete, wood, stainless steel, and Vetrazzo, each of which has its own pros and cons. Wood and stainless steel were eliminated over aesthetics. The remainder were scaled as indicated below. Note there was a small but vocal minority (Sven) that pushed wood due to its low environmental impact and low cost but was quashed due to staining potential, maintenance requirements and aesthetics. After a year's use, the countertop still looks beautiful. Gabby Beil, semolinadesign.com

	Weight	(Scale from 1 - 5) Paperstone	Cambria	Silestone	Ceaserstone	Vetrazzo
Cost	3	1	3	4	5	2
Ease of care	2	4	5	5	5	5
Aesthetics	3	5	4	3	3	2
Green-ness	3	5	2	2	2	5
TOTAL		**41**	**37**	**37**	**40**	**37**

Weight definition

4 Very important
3 Important
2 Something to consider
1 Not a concern

Scale definition

5 Excellent
4 Very good
3 Good
2 Neutral
1 Poor

2.8.5Kitchen Cabinetry, Kitchen

Originally we had chosen IKEA cabinetry as a cost containment measure. But after re-thinking this and realizing that the quality of the IKEA product may require that it be replaced sooner than a custom, wood-not-veneer option, we decided that paying for better quality cabinets from the outset may in the long run be cheaper and "greener". However, due to cost constraints we did not go full custom build. We went with Eco-Home in Berkeley and for semi custom FSC-certified/ low VOC cabinets. We found both the quality and customer service of Eco-home to be lacking; note this has noting to do with the environmental attributes of the cabinets. You are encouraged to talk to Sven or Kate before purchasing from Eco-Home.

2.8.6Clothes Washer, Dryer, and Dishwasher. Laundry Room

These appliances are each ranked in the top ~25% best of class for energy/ water efficiency. Of note is the clothes dryer which is a condensing dryer and “vents” to the interior of the house. Given the Palo Alto climate we primarily let the wind and sun dry our clothes via a clothes line. What was surprising was measuring the clothes washer and dishwasher energy use. The clothes washer uses ~0.1kWh per load and dishwasher uses ~1 kWh, a ten time more as it has a built-in electric heater.

Palo Alto also gives a rebate for energy efficient appliances such as these.

3 Landscaping, Work in Progress

In the spring of 2011, we engaged an extremely creative landscaper to design the garden. Unfortunately the resulting plan did not integrate the home’s greywater generation rate of ~50 to 70 gallons water per day with the selected plants and the cost to implement the design was three times that of our budget. (Sven, the owner, thought I’d communicated these parameters to her!) We have significantly scaled down her plan and only landscaped the front with a combination of native and edible landscaping that provide for wildlife and

human inhabitants while looking reasonably attractive. At present, we are using a drip irrigation system with the goal to convert to grey water or non-potable shallow well water.

3.1 Cardboard Under the Oak/ Oxalis, Backyard

We used leftover cardboard as biodegradable ground cover to kill the oxalis (wood sorrel) growing under the oak tree drip-line. To us, the oxalis is a weed, aka a plant that is growing where it should not be growing. And we have been, in general, successful.

3.2 Chickens, Bees and other Pets

Chickens have been a surprising success. Having navigated the $60 per year Palo Alto permitting process, we have three hens. They lay approximately an egg each per day. We feed them the majority of our compost (the vegetable, stale bread, burnt oatmeal, etc. component). The routine of collecting the eggs, particularly by visiting children, is quite enjoyable and the chickens are quite humorous to watch. The coop (their bedroom, laying area, food and pellet food) was bought used $150 on craigslist and the run, their daytime area, was made of scrap from recovered fence-boards and posts plus, of course, chicken-wire!

We also plan on bees but this is a longer-term project. The children are taking suggestions for other appropriate pets. (No donations please.)

3.3 Fruit Trees

We have planted ~10+ fruit trees believing these to be extremely easy to maintain and harvest from. In just over a year of being in the ground, we have harvested apples, figs,

persimmons, plums, asian pears, and peaches. Yummy, healthy and an extremely low carbon diet!

4 Green Jobs, Master Bedroom

We acknowledge that the labor and material costs for a home of this nature are going to be more than the standard/conventional Californian home. On the positive side, to make these materials and provide the incremental labor, additional people will be employed. This is compared to the conventional home where more money (potentially significantly more money over the life of the home) will be spent buying energy, likely in the form of electricity (hopefully carbon free and from renewable sources) and natural gas (a fossil fuel and potentially from fracking, both bad). However, we believe the incremental employment created by the non-efficient home's energy demand is much less than the employment created by the more energy efficient one. (Power plants and natural gas production/ transportation simply do not require large numbers of employees) To confirm this position, we are looking for a student researcher(s).

5 Deconstruction, Master Bedroom

A 1920s, 2-bedroom, 1-bath termite infested house on the lot was deconstructed in late 2009 and the building materials were donated to a charity. Older homes are more commonly demolished, and the co-mingled waste is sent to a landfill. From an economic perspective, the donating/deconstruction path was essentially the same as demolishing the old house (though this may not be true everywhere).

More importantly, the new home (we very much hope) will comfortably accommodate an extended family and will age better than the previous house.

Recovered materials from the deconstruction include the interior single pane windows between the guest bedroom and the upstairs foyer, and Sophia's bedroom and the foyer.

In addition, we sawed the driveway into blocks and saved the more reasonable-looking (non-cracked) ones. Due to the limited size of the garden, we decided to freecycle them and they are to be pavers at Greg's house in the near future.. The rest of the concrete went for recycling.

6 Transportation

6.1 Plug In Hybrid Electric Vehicle, Ground Floor Foyer

Our latest car is an all-electric Nissan Leaf, "Mrs. Blue" which we got used for $20k in November 2012. The car gets ~90 miles of range (depending on speed, etc) and costs, with our solar panels providing the electricity, less than 2-cent per mile to drive. Because of its great acceleration and handling, it's the family's favorite car to drive. Further, the children are the ones that do the fueling; they can and do plug the car in.

Our second car is a Toyota Prius converted into a plug in hybrid electric vehicle (PHEV) at Maker Faire in 2006 . It was converted to show the public, the automobile manufacturers, politicians, and pundits that plug-in hybrids work! In essence, local miles are powered partly or fully by electricity, and then gasoline provides the standard 300mile+ range. PHEVs (like fully electric vehicles) tackle energy security, jobs and global warming, all at once.

These conversions were successful! The Chevy Volt with 40 miles of all electric range followed by 380 miles of gasoline driving for those long distance trips is selling like hot cakes. How long is your daily drive? Would an all electric or PHEV work for you?

Environmental and Economic Benefits: While running on typical California electric power (from PG&E and the other large utilities) there is a 75% reduction in CO2 compared to running on petroleum energy and provides a similar 75% reduction in fuel cost. Using Palo Alto Green's carbon-free electricity, we have a zero carbon footprint while driving on electricity at a fuel cost of ~4-cents a mile. Compare this to ~20-cents per mile for a vehicle that gets 20 mpg and fuel at $4/gallon.

6.2 Electric Vehicles & Charging, Front Porch

The house was originally built with 3 locations pre-wired to enable electric vehicle (EV) charging. The first is at is at the back of the house in the "carport." The second is the concrete driveway pad plus a standard 110v outlet. The third is curbside. We recommend that all new houses come pre-wired for electric vehicles as it's much cheaper to pre-wire during construction than to retrofit later.

To promote EV driving, and facilitate charging when away from home, our house is listed on plugshare.com and we have charged unknown numbers of EVs through this portal and are likewise happy to charge your EV for free!

To facilitate EV charging, in September, PGH put forth the following to city council which was adopted unanimously:

Understanding that the city of Palo Alto wishes to take a leadership role as one of the most EV friendly cities in America, we encourage City Council to:

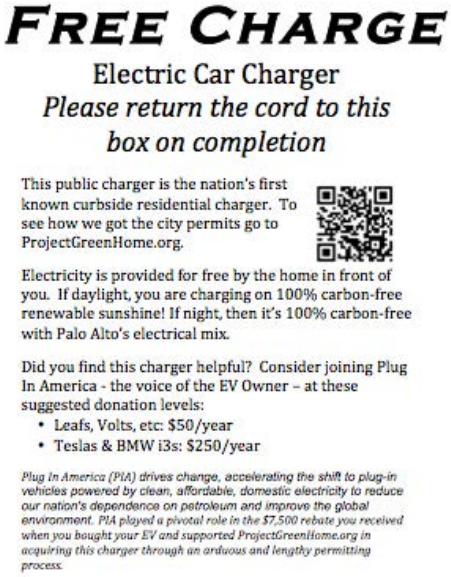
1) *Require all new parking construction (residential, industrial, commercial, research and development, etc) install, to some appropriate percentage, the necessary circuitry etc to be EV charger ready.*
2) *Streamline the EV charging permitting process and reduce the fee;*
3) *Include residential curbside charging as an option in the requested staff report; allow encourage and support residential curbside charging on a case by case basis and not limit the current pilot (the first in the nation) to one home.*

And we encourage those in other cities to request their city council enact a similar ordinance. Especially given that the effort to get this passed was less than expected.

My home EV Charger, my fueling station,
is always open, and there's never a line.

6.3 Curbside Side Electric Vehicle Charging Stations, Front Yard

As most are aware, with an electric vehicle (EV), one typically installs a charger at the driveway or garage. We wanted a second charger to serve EVs parked on the street outside our house, but the land between the street and the sidewalk is public property. We got a 2-year pilot permit to install and operate this curbside charger, from the city of Palo Alto. And we are providing the electricity for free! To our knowledge, this is the first such permit in the nation. If you are interested in doing same, see our website for the full saga and the issued permit which may help you in your quest. Why did we do it? To promote the technology, help reduce range anxiety, have a place for guests to charge when visiting, initiate conversations around fueling EVs and to begin normalizing residential curbside charging.



FREE CHARGE

Electric Car Charger

Please return the cord to this box on completion

This public charger is the nation's first known curbside residential charger. To see how we got the city permits go to ProjectGreenHome.org.

Electricity is provided for free by the home in front of you. If daylight, you are charging on 100% carbon-free renewable sunshine! If night, then it's 100% carbon-free with Palo Alto's electrical mix.

Did you find this charger helpful? Consider joining Plug In America - the voice of the EV Owner – at these suggested donation levels:

- Leafs, Volts, etc: $50/year
- Teslas & BMW i3s: $250/year

Plug In America (PIA) drives change, accelerating the shift to plug-in vehicles powered by clean, affordable, domestic electricity to reduce our nation's dependence on petroleum and improve the global environment. PIA played a pivotal role in the $7,500 rebate you received when you bought your EV and supported ProjectGreenHome.org in acquiring this charger through an arduous and lengthy permitting process.

7 Mistakes Made Along the Way, Downstairs Guest Room

7.1 Polyvinyl Chloride (PVC)

While PVC as a material is useful, its manufacturing process is quite toxic and burning it releases toxic gasses such a dioxins. Hence, as a society we should not use it unless absolutely necessary. Unfortunately, because of its usefulness and lack of awareness of PVC's life cycle toxicity, it can be a common building material. According to the Healthy Building Network, over 14 billion pounds of PVC are produced each year, 75% of which are used for construction due to its inexpensiveness and versatility for building. Though this material is often used, producing PVC can inadvertently emit toxic chemicals that can cause cancer, neurological damage, and other damaging side effects. Dioxin, an extremely powerful carcinogen, has also been found to pollute ecosystems and humans alike, causing dangerous health hazards to both people and wildlife. PVC also contains diethylhexyl phthalate (DEHP), which is a plasticizer that can escape from the plastic and have hazardous effects on the environment after long-term exposure. PVC is also non-recyclable due its high additive content and is an official contaminant.

Our mistake was not to specify at the beginning of the process that we didn't want to use the material and to work with the architect, builder, city permitting authorities and craftsmen to find alternatives. As noted below, we inadvertently used, and in some instances have been required to use, PVC materials.

PVC Conduit for the Photovoltaic System

Rather than mounting the wiring conduit for the photovoltaic on the exterior of the house (running from the west roof down the east roof and then down the exterior of the east wall), we opted to run the conduit internally. Aesthetically, this keeps the smooth, clean exterior lines of the house. However, in running the conduit internally, we had to puncture the house membrane both at the roof and the side of the house. Using metal conduit would have allowed significant heat loss (and gain) into the house due to metal's ability to conduct heat. The option taken was PVC conduit. Any suggestions of materials we could have used are most welcome.

PVC 4" Drain Pipe Around the house to the Sump box

The California State Building Code (?) City of Palo Alto requires a 4" pipe around the house slab foundation. This perforated piping collects any water that might pool around the house and drains it to a sump box/bubbler that sprays it on the yard. Again any suggestions of materials we could have used instead are also welcome.

The Heat Exchanger Condensation Drain Line

The heat exchanger in the attic has a condensation pipe made of PVC. It's not clear if PVC piping is required or there are other options. In our case, it's what came with the unit and what the HVAC crew installed. (In winter, the heat exchanger pulls external air into the house, heating it from the exiting warm interior air, which in turn cools. A portion of the water vapor in the new cooler exiting interior air may condense out depending on the

interior/exterior temperature delta and the interior air water content.) One simple option would have been to use PEX, the same material used in the water pipes.

Stucco Edges
There are some concealed PVC edges on the stucco that we tried to substitute with galvanized steel, but we were unable to find a manufacturer that makes a metal equivalent or other material. Further, if we did find something, we would likely have the common problem of the installer refusing to use it because it's not part of the approved system and if installed becomes the contractor's liability.

PVC in electrical Wiring
Another issue, discovered post-installation, is the PVC insulation on our electrical wiring. Other rubber or plastic options may exist, but we have not researched them. (At this point, it is too late to replace existing wiring.)

7.2 Screening Fence West Side Between the Neighbors

In essence, we missed the opportunity to improve the backyard view-shed for us and our neighbor.

The Redwood (6 foot high) screening fence between us and our west (left) neighbor needed replacing. We and our neighbor agreed to replace it with essentially the same fence style and hired a contractor to do so. When the old fence was removed, we temporarily installed a low "dog fence" between the two houses. This low, somewhat innocuous fence was in place for ~2 weeks and increased the view-shed into each other's backyard plus provided more opportunity to be "neighborly." After the new fence was installed we (and the neighbors) realized we had traded the view and increased interaction with great neighbors for privacy. Given the chance to do this over, we may have opted for a lower fence in the back for these same reasons.

Further, we were also unable to find Forest Stewardship Council redwood lumber. However, we did mount the posts in stirrups and dug a 3-inch trench along the bottom of the fence and filled with drainage gravel, in efforts to decrease rotting.

8 Regulatory Barriers, Upstairs Open Space

Where we yielded to City permitting

8.1 White Roof

As discussed in Section 2.1.6, White Roof, we were not allowed by the city of Palo Alto to install a white roof. *"…The City is concerned about the potential impacts associated with glare and given the close proximity of homes in this neighborhood we believe this is a valid concern…"* As such, our building permit includes *"conditions of approval to assure the metal roof will not be painted white…"*

What is particularly interesting is the immediate city to the North, Menlo Park, seems to have embraced white roofs. See MenloGreen.TypePad.com

8.2 House Positioning

To gain maximum potential solar energy for the roof-mounted photovoltaic system, we needed to put the house in the rear of the lot rather than the front. Unfortunately because the majority (but not all) of the houses in the neighborhood are towards the front, we were likewise required to build the house towards the front. We have not yet worked out how much additional photovoltaic panels we will have to install because of this Palo Alto aesthetic requirement. If we had positioned the house at the back of the lot, according to the city we would have disturbed the "warp and the weave of the neighborhood."

8.3 Garage/ Carport Requirements

It is understood that the garage or carport requirement stems from the city's objective of keeping the residential streets clear of "car clutter." Unfortunately this policy seems to be ineffective in limiting the numbers of cars parked along the curbs. Further, as the majority (but not all) of the garages in the neighborhood are at the back of the lots, we likewise were required to include a rear garage/carport. This meant that valuable land on the side of the house had to be used as driveway versus a garden or play area. Further it forced the house to be more rectangular than desired, again causing a larger footprint over arable land. This was a permitting battle that we lost with the city of Palo Alto as we did not go high enough up the chain-of-command. Do not repeat our mistake! If need be, Sven and Kate the owners will go with you to city hall to prevent this from happening again. In our case we built a rather expensive outdoor, covered table tennis playing area that legally meets the definition of a carport. We park our electric car outside at the front on the short permeable concrete driveway beside the electric vehicle charger. The photo shows a home that we could have had with the garage at the front.

8.4 Graywater infused with 1% Urine

The laundry drain, all of the sinks and showers, plus the urine diverting toilets are kept well separate from the blackwater line. Given the 1% urine, permitting this system with a flow rate ~50-70 gallons per day is difficult. And we are looking for volunteers to assist..

9 Partners, Study, Upstairs Guest Bedroom

Research Institutions, Non Profit Organizations and Universities

9.1 Lawrence Berkeley National Laboratory (LBNL)

LBNL has conducted several tests on the home to determine airflow efficacy and levels/types of airborne chemical contaminants in tightly sealed homes such as ours and we are awaiting results of these studies.

9.2 Acterra

Acterra, a local non-profit environmental organization has conducted a performance review/ audit of the home via its Green@Home program. The Green@Home program allows everyday residents to play their part in combating climate change by delivering house calls to citizens in the Bay Area to help install energy saving devices and draft plans to reduce waste. During the visit, the total electricity, gas, and water usages were determined, as well as ways to reduce both consumption and costs. One finding of note at PGH was determining that the fridge's freezer compartment, while indicating -2C on the display (an appropriate temperature), the in-freezer measured temperature was -12C. We were wasting energy by keeping the freezer colder than necessary (we measured 1.9 kWh/day versus the rated 1.3 kWh/day, see Section 2.8.2) and this likewise explained the extremely hard ice cream. The freezer was found to have a faulty sensor which has since been replaced. The full report is in Appendix 2.

In summary, we would encourage every homeowner and renter to participate in the free Green@Home program, not only will you save energy but also money.

In addition, Acterra has adopted the educational component of Project Green Home. As such interns, and we are always looking for more, are being funded via tax-deductible donations to Acterra to perform research on the house, serve as docents and other educational related tasks.

9.3 Bay Area Climate Collaborative (BACC)

The BACC has been quite supportive of PGH particularly in serving as the lead organizer for PGH's June 2011 open house, which attracted over 400 attendees. This support stems from PGH and BACC sharing the same objectives in respect to green/ clean technological innovation and implementation, green jobs, and the imperative need to address global warming.

9.4 UC Berkeley

Early in the design process, graduate students assisted the architect in running various energy efficiency calculations/models for each of several initial designs. In addition, a group of undergraduate students calculated and wrote a paper evaluating how much photovoltaic energy would be required to make PGH a zero net energy house (they underestimated by ~20%). Finally, PGH has been included in various grant applications as a potential research subject by both UC Berkeley and Stanford.

10 Providers

The companies that built our home.

10.1 Architect – Arkin Tilt

Arkin Tilt Architects is an award-winning firm specializing in energy and resource efficient design. Our projects embody a marriage of thoughtful design and ecology, creating spaces that are comfortable and lyrical. We pay particular attention to the integration of the built

and natural environments—from siting to careful detailing. We have extensive experience with alternative construction systems, including straw-bale and rammed earth, renewable energy systems, gray water, and non-toxic and recycled materials. Our projects include residential and commercial, park buildings, religious facilities, and Eco-Resort planning and design.

Winner of the Acterra Business Award for the Sustainable Built Environment, two COTE/AIA Top Ten Green Project Awards, and numerous other design awards, our work has been published nationally and internationally for excellence in design and sustainability. With electric and biodiesel cars and solar electricity, we are working to limit the office's carbon footprint. 510-528-9830 ArkinTilt.com

10.2 Construction Project Manager/ Builder/ Passive House Consultant

Joshua Moore, owner of Red Company LLC, is the Project Manager responsible for the home's construction. In addition to his Project Management skills, he is both a licensed architect and contractor, plus a Passive House Consultant who brings a wealth of building and design experience to the project. Moore is an advocate for the Design-Build process in that "only through accepting, embracing, and knowing the hard realities of construction will we be able to affordably and practically design our way to a better future." 510-812-5688 RedBuildings.com

10.3 Plumber – Moomau

Moomau Plumbing is a plumbing repair, construction, and replacement service with over 30 years of experience. A fully licensed and insured contractor, based in San Jose, Moomau plumbing serves the greater Bay Area for plumbing needs of all kinds. 408-396-3837 MoomauPlumbing.com

10.4 Roof – Custom Copper and Sheet Metal Roofing

Custom Copper and Sheet Metal Roofing is excited to be a part of Project Green Home. As third generation sheet metal experts, they are pleased to bring their sheet metal installation expertise to the Cool Metal Roofing system that will be used to further achieve a zero net energy home. Though they have been designing and installing similar sheet metal and copper roofing applications for many years, the recent technological advancements in the metal roofing finishes over the last several years have given way to "Cool Metal Roofing" products. Cool Metal Roofing systems provide a number of advantages over conventional roofing products. Some of these advantages include EPA EnergyStar approved high reflectivity values, up to 85% heat emissivity values, 45-year plus durability warranties, and the knowledge that metal roofs are 100% recyclable.

These fine metal products are also skillfully installed by their staff on additional building applications including siding, awnings, flashing, gutters and other exterior sheet metal customizations. 916-346-5436 Ccsmr.com

10.5 HVAC – Bayside Mechanical

Bayside Mechanical installed the Altherma unit (hot water for both the radiant floor system and potable water), the radiant floor system and the heat-recovery ventilator. They offer

expert mechanical engineering and plumbing services. Throughout the Bay Area they have helped residential and business customers achieve their desired Heating, Air conditioning, and/or Ventilation goals. Based on your needs Bayside Mechanical Inc. will design, install, service and/or repair any Heating, Ventilation, and Air Conditioning systems. Specializing in both residential and commercial projects, Bayside Mechanical is your solution for all your Heating, Ventilation, and Air Conditioning needs. 650-578-9080 BaysideMech.com

10.6 Insulation – Tri-County Insulation

Tri-County Insulation and Acoustical Contractors is proud to be a part of Project Green Home. They have been specializing in insulation products in the Bay Area for over 36 years. As time has passed, the technological advances in insulation have escalated and so has the interest in insulation. As insulation has advanced so have their skills and knowledge of what can be done to make homes more energy efficient with cleaner air and more comfortable, responsible living.

The Owens Corning's Energy Complete System was used on Project Green Home, along with Pro-Pink Complete Blown-In Wall System, also by Owens Corning. Pro-Pink Complete Blown-In Wall System has a high recycled content of 53%, Green Guard Certified, and low VOC's. 800-246-7858 TriCountyInsulation.com

10.7 Stucco – Green Wall Tech

Green Wall Tech provided and installed the stucco. Their focus is drywall systems, plaster & stucco systems and architectural detailing and trim projects. 510-252-1170 GreenWallTech.com

10.8 Student Booklet Editors

Jessica Tam is a current senior at Palo Alto High School who has been collaborating with Sven Thesen and Project Green Home to provide updates and conduct research for the booklet. Her prior experience working with the environment includes an internship with the Acterra Stewardship Program, performing habitat restoration for Arastradero Preserve, and regularly volunteering with CuriOdyssey, an environmental education museum located in San Mateo. Jessica is also the 2012-2013 Associated Student Body President at Paly and a member of the Pacific Ballet Academy Studio Company. She enjoys educating the public about environmental consciousness and sustainability and hopes to pursue a future career in renewable energy.

In Memoriam

Dr. Edgar Wayburn, M.D., 1906-2010

Dr. Edgar Wayburn has been described as "America's most effective (and least known) wilderness advocate." A five term president of the Sierra Club, he was a major factor in the creation of the Golden Gate National Recreation Area, which includes roughly 200,000 acres in south and west Marin, San Francisco, and beyond. No other city in America -- perhaps the world -- has anything that can compare with it. When Dr. Wayburn was awarded the Presidential Medal of Freedom in 1999, President Clinton said, "He has saved more of our wilderness than any person alive."

Dr. Stephen Schneider, 1945-2010

Stephen Schneider was a renowned climate change researcher. A professor of biology at Stanford University, he founded the journal *Climactic Change*, and served as a scientific consultant to the White House under every president since Nixon. A MacArthur Fellowship recipient, and author of two books and countless scientific papers, he shared the 2007 Nobel Peace Prize with former Vice President Al Gore and the other United Nations Intergovernmental Panel on Climate Change scientists and engineers.

11 In Memoriam

11.1 Dr. Edgar Wayburn, M.D.

Dr. Edgar Wayburn died on March 5th, 2010, at the age of 103. In his life, he served as president of the Sierra Club for five terms, and he has been described as "America's most effective (and least known) wilderness advocate."
Dr. Wayburn was the leading force in the expansion of Mt. Tamalpais State Park, from a mere 870 acres to more than 6,000 acres. Later, he spearheaded the establishment of Point Reyes National Seashore, the first national park unit of any size near a major metropolitan area. That was followed by the formation of Golden Gate National Recreation Area, which combines nearly all the open space in south and west Marin, plus some lands in San Francisco and beyond, including the city's beaches, Alcatraz and the Presidio. All told, it amounts to some 200,000 acres. No other city in America -- perhaps the world -- has anything that can compare with it.

For all his accomplishments, Ed Wayburn was never a full-time conservationist. A practicing physician and a family man, he dedicated his spare hours and weekends to the health of the planet. Neither was he well known, even within the environmental movement, having never gained the wide recognition of such contemporaries as David Brower and Ansel Adams. The low profile suited him fine. Dr. Wayburn preferred to do his work quietly, behind the scenes. He was a born facilitator and diplomat, someone who exuded the kind of authority and integrity that gets people -- even powerful people -- to listen.

Where others might have been content to save random parcels of land -- whatever scraps could be spared – Dr. Wayburn wanted nothing less than the protection of whole watersheds. As he explained in his memoir, ***Your Land and Mine***, "It wasn't enough simply to add a few acres here and there; nature doesn't divide herself into measured plots. A watershed encompasses the chain of life; if any part is developed, the integrity of the whole ecosystem is threatened."

That devotion to ecological principles guided him through many subsequent wilderness campaigns, including the decades-long struggle to found, and later expand, Redwood National Park. Years of travel in the Alaskan backcountry with his wife Peggy -- herself a prominent wilderness advocate -- led eventually to his crowning achievement: Passage of the 1980 Alaska National Interest Lands Conservation Act, which created ten new national park units and effectively doubled the size of America's National Park system. When Dr. Wayburn was awarded the Presidential Medal of Freedom in 1999, President Clinton said of him, "He has saved more of our wilderness than any person alive."

Most of this biography is taken from the Sierra Club website, and was written by Pat Joseph, the executive editor of California magazine.

11.2 Dr. Stephen H. Schneider

Stephen Schneider was a professor of biology at Stanford University. He died of a heart attack on July 19th, 2010, on his way back from a conference in Sweden. He was a leader among the Intergovernmental Panel on Climate Change scientists and engineers, whose climate research earned a Nobel Peace Prize in 2007, an honor they shared with former Vice President Al Gore.

Schneider was influential in the public debate over climate change and wrote a book, *Science as a Contact Sport: Inside the Battle to Save Earth's Climate,* about his experiences. He also wrote a book, published in 2006, about his battle with mantle cell lymphoma, *Patient from Hell*. He drew a parallel between his climate-change research and his involvement in designing the treatment regime for his cancer. In both cases, he said, there was a need to predict the future with incomplete evidence, and yet there was no room to be wrong.

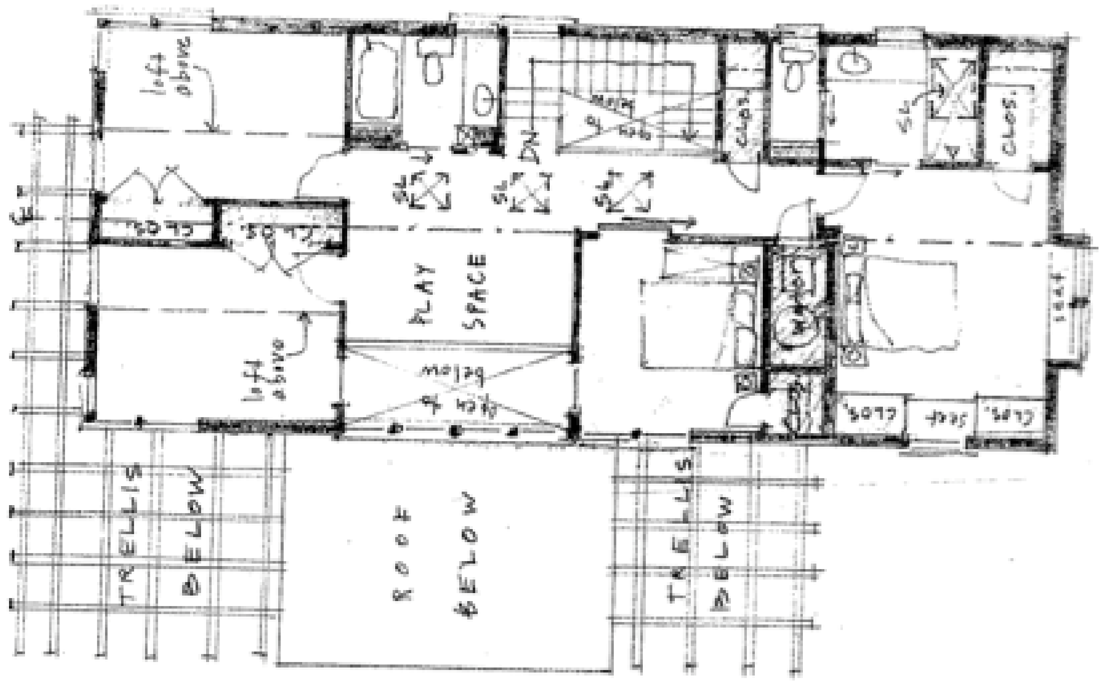
"The Stanford family is profoundly saddened by the loss of Stephen Schneider," said Stanford President John Hennessy. "He was a valued member of our community and a passionate advocate for our planet. A world-renowned scholar, he focused on the impact of human activities on climate change in his teaching and research, and his contributions extended well beyond our campus. Through the many ways he sought to increase understanding of the implications of climate research among the general public, policy makers and global leaders, Stephen Schneider worked to make the world a better place for us all."

At Stanford, Schneider was the Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies, professor of biological sciences, professor (by courtesy) of civil and environmental engineering, and a senior fellow in the Woods Institute for the Environment.

In recent years, he mourned, with his usual high level of verbal energy, the loss of talented science writers from newspapers. In the sound-bite feuds of television, he said, climate researchers were given a scant few seconds to explain complicated issues. "So what I'm trying to do is get media and the political world to stop framing climate change in either/or terms, when we're really looking at a bell curve of possibilities," he recently told *Stanford* magazine.

Said Pamela Matson, dean of Stanford's School of Earth Sciences: "He is irreplaceable – as a colleague, adviser, friend and scientist. In his science, he has done more for the world than most of us recognize, and our children will thank him."

Most of this biography is taken from Stanford University's website, in the News section, and was written by Louis Bergeron and Dan Stober.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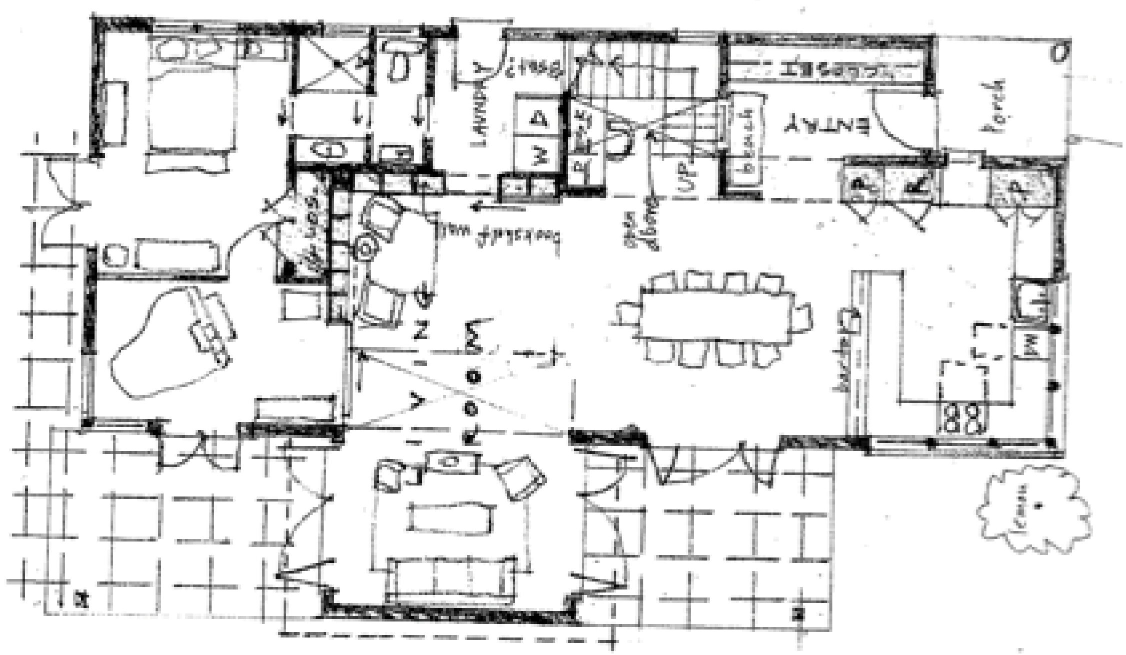
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From: Paul Wermer
To: Peskin, Aaron (BOS); Safai, Ahsha (BOS); Preston, Dean (BOS); Major, Erica (BOS)
Cc: Stefani, Catherine (BOS); Mullan, Andrew (BOS); SF Climate Emergency Coalition
Subject: Today"s hearing: File # 200701 [Building Code - Mandating New Construction Be All-Electric]
Date: Monday, September 21, 2020 8:34:12 AM
Attachments: restaurants with all-electric kitchens.pdf

Dear Supervisors:

This draft legislation is a major step forward in San Francisco's actions to reduce our greenhouse gas (GHG) emissions, recognized as a critical problem in the April 2019 Climate Emergency Resolution.

It is unfortunate, however, that the exceptions offered in the June 30 draft legislation (and the related draft Department of Building Inspection policy for implementation, AB-112) establishes multiple exceptions that are not necessarily in the public interest, but rather are predicated on financial considerations of the developer.

It is important that these issues be addressed now – because any new buildings with natural gas only complicate the future problem of retrofitting the existing building stock in a timely manner.

There are two issues that must be addressed: 1) A transparent exception process that identifies buildings seeking an exception and a public hearing, similar to Planning's Variance hearings; 2) Requiring that any exception be justified as being in the public interests, similarly to Planning's process for granting Conditional Use Authorization to a project.

There are a few cases where an exception is appropriate. These are the circumstances where an adequate electrical supply cannot be provided to the building due to current (but not future) grid constraints, and the building is built as fully electric ready. In this case a building can be readily converted to all electric with minimum disruption to the occupants, as the infrastructure enables replacement of the gas appliances with electric appliances without structural changes, interior demolitions, etc.

No use of natural gas in a building should be permitted without an exception. This is not an energy code, after all, but a health and safety issue, as SFE has made clear.

There are some activities that require a natural gas feed – such as producing hydrogen gas via steam reforming. There are many reasons why a steam reforming plant has no place in a dense urban environment such as San Francisco.

But after excluding industrial processes that have no place in San Francisco, a review of available technologies reveals that everything from high fire ceramics kilns to Bunsen burners have electric alternatives.

In the exceedingly rare case where a gas flame might be required for an essential test or process, there are much safer alternatives to the traditional Bunsen burner. These alternatives

offer much more precise control and do not require natural gas plumbed to the building. Permitting uses because they are not related to space conditioning, water heating, cooking and clothes drying is not justified, given the health and safety concerns of natural gas use in buildings.

It is abundantly clear that all-electric restaurant kitchens are not only possible but preferred because of the increased control the of the cooking process (see attached).

In short, there is no need for gas in San Francisco, provided adequate grid capacity exists – and the electric technologies are far more energy efficient than gas.

Yet in San Francisco, the combination of Public Works, Planning and PG&E requirements for locating a transformer needed to supply electricity to a large building may make it impossible to provide adequate electric power to the building. And so DBI has decided that, for "small infill lots", they will automatically grant an exception, even if it is possible to locate the transformer in a sidewalk vault in the public right of way. For some reason, even though everyone agrees financial considerations do not justify an exception, requiring installation of a transformer in a sidewalk vault, even when it meets Public Works criteria, does justify an exception.

Worse, in those cases where a transformer cannot be placed a sidewalk vault because of space constraints, DBI's draft policies will allow a building to be constructed that cannot operate as designed if the natural gas supply is removed. This will impose significant costs and disruption on the owners and occupants of the building, almost certainly by 2045, and quite possibly much earlier – meaning that San Francisco would be permitting use of scarce, valuable real estate for buildings that would have a life of less than 25 years before requiring major reconstruction.

Worse, there is no provision that prospective buyers or tenants be informed that in less than 25 years, building conversion will be expensive, disruptive, and may remove space the occupants are currently using of other purposes.

If the building cannot go all electric as designed (size, features) then perhaps that building should not be permitted. Is it worth building housing that will evict some occupants in less than 25 years?

There are several actions that you, as supervisors, can take to mitigate many of the problems:

1) Establish a public hearing process as part of the exceptions process, with a clear public interest requirement for any buildings where exceptions are granted and a clear process for future conversion to all electric is established.

2) Ensure that market forces encouraging all electric construction are leveraged, by requiring disclosure of the risks of future costs and disruption when purchasing a newly constructed mixed fuel building, costs that entail stranded assets as well as construction costs and possible loss of usable space.

3) Mandate a review and public hearings on San Francisco's polices with respect to transformer siting. This should involve Public Works, Planning and DBI, with input from PG&E and CleanPower SF to clarify how grid modifications or different in-building electric infrastructure might resolve current constraints. Unfortunately, it appears that this will require

direction from the Board of Supervisors, as the agencies reporting to the Mayor have not recognized this need, choosing instead to double down on existing policies in their response to the June 30 draft.

I urge you to address these crucial issues.

Sincerely,

Paul Wermer

--
Paul Wermer
2309 California Street
San Francisco, CA 94115

[CA-BD] 3 Michelin Star restaurants with all-electric kitchens

Sean Armstrong <sean@redwoodenergy.net> Sun, Sep 20, 2020 at 3:02 AM
To: CA Building Decarbonization <ca-building-decarbonization@googlegroups.com>, 100% Clean Energy <100-PERCENT-CLEAN-ENERGY@lists.sierraclub.org>

Hi Team!

For the City of San Mateo all-electric reach code hearing this week, I spent a few hours reviewing kitchen tours to confirm that there are lots of 3 Michelin Star all-electric restaurants world-wide. I have provided the best video evidence I found, but I always reviewed at least 3 videos to make sure I didn't miss anything. I was pleasantly surprised to find that almost every one I reviewed was all-electric--13 of the 16 I reviewed, out of a total 137 restaurants with 3 Michelin Stars.

- Les Prés d'Eugénie in the South of France has had 3 Michelin Stars since 1977, and has an all-electric kitchen (excepting the roasting spit in the open wood fireplace)
- The Le Louis XV in l'Hôtel de Paris (3 Stars) bills itself as the most exclusive restaurant in Europe and has an all-electric kitchen
- The Fat Duck (3 Stars) in Berkshire, England is has a brand new all-electric kitchen to accomplish its whimsical, narrative courses
- Maaemo, the only 3 Michelin Star restaurant in Norway, has an all-electric kitchen for it's incredible wild crafted mini-sculptures of ocean scenes
- Restaurant Amador in Vienna is Austria's only 3 Michelin Star restaurant and is all-electric, and the many-times-over Michelin Star awarded chef Juan Amador and proprietor has opened other all-electric restaurant in Germany
- Geranium, the only 3 Michelin Star restaurant in Denmark, has an all-electric kitchen
- Hof van Cleve, the only 3 Michelin Star restaurant in Belgium, has an all-electric kitchen
- Azurmendi of Larrabetzu, Spain (3 Stars) is all-electric and also bills itself as the most sustainable restaurant in the world
- Robuchon au Dôme in Macau (3 Stars) bills itself as one of the greatest restaurants in Asia and is all-electric
- The Restaurant de l'Hôtel de Ville (3 Stars) in Crissier, Switzerland is one of the finest classic-but-creative restaurants in Europe and has an all-electric kitchen.
- Both the French Laundry in Napa and Per Se in NYC have 3 Michelen stars and are led by chef Thomas Keller. Per Se is all-electric, which you can see in this tour. The French Laundry's original kitchen still has gas, but the larger kitchen Thomas Keller custom-built in a new building for the French Laundry is all-electric. While both the old and new kitchens are used each night, Thomas Keller clearly prefers the new all-electric one in his tours because of the exacting control he has over temperatures when making dishes like sous vide. Thomas Keller's 1 Michelen Star bistro, Bouchon, is also all-electric.
- Alinea in Chicago (3 Stars) is all-electric. Lots of fun video tours of them in the kitchen blowing up balloons full of aromas for people to "eat" for desert. Again, extremely demanding requirements for temperature control.

While looking at other kitchen tours I happened upon La Terraza (only 1 Michelin Star) in the Hotel Eden in Rome, which was recently renovated and has an all-electric kitchen.

So, hopefully this clearly illustrates that some, perhaps most, of the finest dining available in the world is performed in all-electric kitchens.

Warm regards,
Sean

--
Managing Principal
Redwood Energy

707.826.1450
1887 Q Street
Arcata, CA 95521
www.redwoodenergy.net

Grand Prize Winner of the United Nations World Habitat Awards-2017
Grand Prize Winner of the International PCBC Gold Nugget Awards-2016
Winner of the Sustainability Award of the Building Industry Association of Southern California-2017
Winner of the Department of Energy Innovation Award-2015 and 2020
Awards of Merit from the International PCBC Gold Nugget Awards-2016, 2017, 2018 and 2019
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From: Liliana Peliks
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Ronen, Hillary
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Monday, September 21, 2020 6:59:24 AM

Land Use Committee, Board of Supervisors, and Sup. Ronen,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Liliana Peliks
lilianalmatos@gmail.com
725 Banks Street
San Francisco, California 94110

From:	Diane Bailey
To:	Major, Erica (BOS)
Cc:	Peskin, Aaron (BOS); Hepner, Lee (BOS); Safai, Ahsha (BOS); Sandoval, Suhagey (BOS); Preston, Dean (BOS); Smeallie, Kyle (BOS); MandelmanStaff, [BOS]; Bintliff, Jacob (BOS); Raphael, Deborah (ENV); Board of Supervisors, (BOS)
Subject:	Public Comment in support of: All-Electric New Construction Ordinance (File 200701)
Date:	Sunday, September 20, 2020 11:52:57 PM
Attachments:	image001.png

Dear Supervisors,
On behalf of the Campaign for Fossil Free Buildings in Silicon Valley (FFBSV), this letter expresses our strong support for the All-Electric New Construction Ordinance in San Francisco. Although we are in unprecedented times with a pandemic and economic downturn, city building electrification regulations are critically needed to address the magnitude of the climate, air quality, health, and safety impacts of current fossil gas use in our homes and buildings.

FFBSV includes the 33 organizations working together to support an accelerated phase out of fossil fuels in buildings.[i] A rapid transition away from fossil fuel use is critical to avoid the very worst and irreversible impacts of climate change. Preventing the use of fossil fuels, including natural gas, in new construction will create more affordable, cleaner, healthier, and more resilient housing and buildings for communities throughout San Francisco.

Building Electrification is an Urgent Climate Action

The recent extreme heat, unusual lightning activity, reduced marine layer, and unprecedented wildfire activity are all hallmarks of climate destabilization that we are experiencing. The depth of the climate crisis is worse than commonly understood and demands urgent action. In addition to sobering current conditions and devastating long-term climate consequences, Redwood City faces significant near-term risks of flooding from sea level rise and inundation of entire neighborhoods. In 2018, the Intergovernmental Panel on Climate Change (IPCC) concluded that ***we must dramatically reduce Greenhouse Gas (GHG) emissions by 2030 through rapid, far-reaching, and unprecedented measures.***[ii] Since that report was issued, we have seen greater impacts from climate change than anticipated.[iii] Current trends for carbon emissions and lack of action show that we are headed to *twice* the rate of warming that the Paris Climate Accord sought to contain.

<u>We recommend the following improvements to the ordinance:</u>

1. Please make electric-ready required for all buildings granted an exemption;
2. Please include laboratory and industrial uses in the prohibited uses of natural gas;

3. Please create a clean energy building hub to coordinate resources and training;
4. Please add a public interest exception and more public oversight and visibility into exemptions; and
5. Please eliminate the waiver for restaurants.

Over a dozen local cities have adopted all-electric requirements for new construction that avoid new Fossil Gas use because there are many benefits to community health, safety, and a stable climate future, including:

- **Economic**: All-electric homes are less expensive to build (saving roughly $3,000 or more for each new apartment unit, for example). In all of the buildings analyzed by the 2019 Nonresidential New Construction Reach Code Cost Effectiveness Study, all-electric versions cost less to construct than their mixed-fuel counterparts. **All-Electric buildings are also more efficient**. For example, according to the California Energy Commission, a modern high efficiency heat pump electric water heater (available now at major retailers) costs roughly one third less on utility bills to operate than the most efficient gas water heater.[iv] In addition, all-electric buildings include air conditioning combined with heating, resulting in less equipment, reduced maintenance costs and greater climate resilience.

- **Public Safety:** Natural gas is highly flammable. In the past ten years, 9,000 gas explosions in the U.S have killed over 500 people, and gas leaks have displaced and sickened thousands of people.[v] Fossil Gas also caused half the fires after two major California earthquakes.[vi]

- **Public Health:** Gas stoves release smog-forming compounds such as nitrogen dioxide, unburnt hydrocarbons and carbon monoxide pollution that doubles risks for heart and lung disease and triples the use of asthma medications.[vii] ***In fact, studies have shown that children living in homes using gas for cooking have a more than 40% higher risk of having asthma***.[viii] Further, improperly vented gas appliances lead to carbon monoxide poisoning that results in thousands of emergency room visits and several hundred deaths every year.[ix]

- **Climate:** All-electric buildings are a highly visible and practical step forward to address the climate crisis, by breaking the cycle of fossil fuel dependency in buildings. According to the GHG inventory, natural gas usage in Redwood City buildings accounts for 45% of the GHGs generated in the city. This is the single biggest step that cities can take to address climate this year.

- **Construction Time Savings:** All-electric buildings are generally faster to design, permit, and build. The code is easier for building and planning staff to apply, and it is also easier for everyone to understand.

- **Resilience:** All-electric code today prevents a complex, costly and likely inevitable switch to electricity in the future, since gas prices are expected to rise sharply, and California is planning to eventually end gas distribution. PG&E has asked for a 24% gas rate increase and SoCalGas, a 42% increase, over the next couple years, and this is just the beginning. **Building all-electric now will help future-proof San Francisco.**

For all of these reasons stated above, **we respectfully ask that the recommendations above be considered and above all else, urge you to vote yes for this important all-electric new construction ordinance.** Thank you for considering our comments.

Sincerely,
Diane Bailey, on behalf of the Campaign for Fossil Free Buildings in Silicon Valley

Diane Bailey | Executive Director
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diane@menlospark.org | 650-281-7073
Visit us: www.MenloSpark.org & www.FossilFreeBuildings.org
Find us on Facebook
Follow us on Twitter

Climate Neutral for a Healthy, Prosperous Menlo Park

EV, PV & Fossil Free*: Guides for Electric Cars, solar & Fossil Free Homes at:* http://menlospark.org/what-we-do/

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[i] Learn more about the FFBSV Campaign and find resources at www.FossilFreeBuildings.org

[ii] https://www.ipcc.ch/sr15/ *Also see*: WRI blog for a roundup of the landmark reports of 2018 & a comparison of climate impacts in a 1.5 deg.C v. 2 deg.C world: https://www.wri.org/blog/2018/12/2018-year-climate-extremes

[iii] For example, the 2019-2020 Australian wildfire that destroyed over 10,000 buildings and killed at least 34 people, and a massive global bleaching event for coral reefs impacting hundreds of millions of low income people who rely on fisheries for their food or livelihoods.
See: A roundup on the latest global reports showing a worsened outlook than previously understood, including an estimated 3-5 degrees C of likely warming by the end of the century, here:
https://docs.google.com/document/d/1-LHZe9kFhLymXE7CaVZmgQTx8VEfbGKAVOSK_x4TcDo/edit?usp=sharing
This WRI blog discusses the state of international climate negotiations as of COP25 and what is required moving ahead:
https://www.wri.org/blog/2019/12/cop25-what-we-needed-what-we-got-whats-next
This NYT OpEd discusses why climate action is essential in the midst of the COVID-19 pandemic and how to integrate a climate response into the economic recovery required: https://www.nytimes.com/2020/04/15/opinion/climate-change-covid-economy.html?smid=em-share

[iv] Rider, Ken, Email correspondence, ken.rider@energy.ca.gov. March 2020.

[v] Joseph, George. "30 Years of Oil and Gas Pipeline Accidents, Mapped." Citylab. November 30, 2016
Sellers, F., Weintraub, K. and Wootson, C. (2018). "Thousands of residents still out of their homes after gas explosions trigger deadly chaos in Massachusetts." Washington Post. https://www.washingtonpost.com/national/thousands-of-residents-still-out-of-their-homes-after-gas-explosions-trigger-deadly-chaos-in-massachusetts/2018/09/14/802ff690-b830-11e8-94eb-3bd52dfe917b_story.html

[vi] Los Angeles in 1994 and San Francisco in 1989, according to the California Seismic Safety Commission. (2002). "Improving Natural Gas Safety in Earthquakes." SSC-02-03
Taylor, Ann. "The Northridge Earthquake: 20 Years Ago Today." The Atlantic. January 17, 2014.

[vii] Jarvis et al. (1996) “Evaluation of asthma prescription measures and health system performance based on emergency department utilization.” https://www.ncbi.nlm.nih.gov/pubmed/8618483

[viii] Lin, W., Brunekreef, B. & Gehring, U. Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children. Int. J. Epidemiol. 42, 1724–1737 (2013).

[ix] USDN, Methane Math, https://sfenvironment.org/sites/default/files/fliers/files/methane-math_natural-gas-report_final.pdf

From:	Donna Benedetti
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Sunday, September 20, 2020 11:39:03 PM

Land Use Committee, Board of Supervisors, and Sup. Preston,

I'm a resident of San Francisco District 5 writing to strongly support prohibiting natural gas in new construction.

San Francisco prides itself on being a leader in improving the health and safety of all her residents. The use of natural gas is antithetical to our well-being. Methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses.

Now is the time for all of us--and especially our elected officials--to take a courageous stand and vote to end our reliance on environmentally hazardous natural gas in all new buildings.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find “sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Donna Benedetti
donnajean720@sbcglobal.net
720 Gough Street #33
San Francisco, California 94102

From:	Erika Reinhardt
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Haney, Matt (BOS)
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Sunday, September 20, 2020 9:34:16 PM

Land Use Committee, Board of Supervisors, and Sup. Haney,

I'm a resident of San Francisco in District 7, writing to strongly support prohibiting gas in new construction. It's beyond time that we act on the many dangers to human life and well-being that relying on natural gas in our buildings pose — from indoor air pollution and climate change, to explosion and fire-risks. I'm thrilled for the possibility of San Francisco earnestedly becoming a leader here, for the benefit of all residents.

As the mother of a now pre-asthmatic toddler after unknowningly exposing him to the dangers of gas stove cooking, the impacts here are known and personal, and not at all hypothetical. It's tragic that that same story, and much worse, is repeated thousands of times just in our city.

In addition to strongly recommending that the ordinance be passed quickly in order to take effect as soon as possible, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

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6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Erika Reinhardt
embreinhardt@gmail.com
182 Howard St, #150
San Francisco, California 94105

From: Vicky Zhang
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 9:02:13 PM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco District 8 writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Vicky Zhang
vicky11zhang@gmail.com
3861 23rd Street
SAN FRANCISCO, California 94114

From: Margaret Chen
To: Major, Erica (BOS)
Subject: electrification
Date: Sunday, September 20, 2020 8:29:47 PM

As a resident of SF and physician, I would like to add a health perspective to your consideration of Supervisor Mandelman's proposed ordinance to amend the building code to require that new construction be all electric. The health benefits would be substantial, and would arise from improved air quality and decreased emissions of greenhouse gases carbon dioxide and methane.

1. Air quality and health impacts.

I would like to call your attention to some key findings of the 2020 UCLA Fielding School of Public Health study, Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California.

Indoor air quality findings included:

- Gas appliances emit a wide range of air pollutants, such as carbon monoxide (CO), nitrogen oxides (NOx, including nitrogen dioxide (NO2)), particulate matter (PM), and formaldehyde, which have been linked to various acute and chronic health effects, including respiratory illness, cardiovascular disease, and premature death .
- Under a hypothetical cooking scenario where a stove and oven are used simultaneously for 1 hour, peak concentrations of NO2 from cooking with gas appliances exceed the levels of acute national and California-based ambient air quality thresholds in more than 90% of modeled emission scenarios .
  Concentrations of CO and NO2 resulting from gas cooking are the highest for apartments, due to a smaller residence size . This presents an additional risk for renters, who are often low-income .
- The use of kitchen appliances for supplemental heating can increase exposure risks, and there is evidence this disproportionately affects low-income households, though more data on the frequency of use is needed to quantify the risk to various populations .

- Outdoor air quality findings included:

- Gas appliances are also a source of outdoor air pollution, and literature shows that the pollutants released by combustion can lead to illness and premature death

From: Margie Chen
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Stefani, Catherine (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 8:25:38 PM

Land Use Committee, Board of Supervisors, and Sup. Stefani,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Margie Chen
paredocs@gmail.com
2722 Green St
San Francisco, California 94123

From: Hilary Karls
To: Major, Erica (BOS)
Cc: Preston, Dean (BOS)
Subject: Public Comment Re: BoS File 200701
Date: Sunday, September 20, 2020 4:57:40 PM

Good afternoon Ms Major and Mr Preston,

I'm a 15 year resident of San Francisco writing to strongly support prohibiting gas in new construction, particularly remembering the San Bruno fire a little over 10 years ago. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

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5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sincerely,

Hilary Karls

221 Downey St #2

94117

From: Aaron Goodman
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 4:06:08 PM

Land Use Committee, Board of Supervisors, and Sup. Safai,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

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an exemption.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Aaron Goodman D11

Aaron Goodman
amgodman@yahoo.com
25 Lisbon St.
San Francisco , California 94112

From: Christine Strohl
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Ronen, Hillary
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 3:01:31 PM

Land Use Committee, Board of Supervisors, and Sup. Ronen,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Christine Strohl
ccelic@gmail.com
357 Moultrie Street
san francisco, California 94110

From: Glynis Nakahara
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Yee, Norman (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 2:59:09 PM

Land Use Committee, Board of Supervisors, and Sup. Yee,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Glynis Nakahara
gnakahara@yahoo.com
10 Cerritos Avenue
San Francisco, California 94127

From: Amy Lyden
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Sunday, September 20, 2020 10:21:43 AM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco in District 8 writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

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6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Amy Lyden
amy.m.lyden@gmail.com
466 14th St, APT 8
San Francisco, California 94103

From: beverlyjmccallister@hotmail.com
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Stefani, Catherine (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Saturday, September 19, 2020 3:34:37 PM

Land Use Committee, Board of Supervisors, and Sup. Stefani,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

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an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

beverlyjmccallister@hotmail.com
2418 Washington Street
San Francisco, California 94115

From: Ericka Moreno
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Saturday, September 19, 2020 1:44:21 PM

Land Use Committee, Board of Supervisors, and Sup. Safai,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

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an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Ericka Moreno
edjnsshoemaker@gmail.com
2 Edinburgh Street
San Francisco, California 94112

From:	Geraldyne Masson
To:	Major, Erica (BOS)
Cc:	Marstaff (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject:	Public Comment Re: BoS File 200701
Date:	Saturday, September 19, 2020 10:10:12 AM

Hello,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sincerely,

Géraldyne Masson

From: Kathryn Vigilante
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Stefani, Catherine (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Friday, September 18, 2020 3:23:41 PM

Land Use Committee, Board of Supervisors, and Sup. Stefani,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Kathryn Vigilante
katievigilante@gmail.com
1267 Chestnut Street, Apt 2
San Francisco, California 94109

From:	Carol Brownson
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Stefani, Catherine (BOS)
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Friday, September 18, 2020 2:59:48 PM

Land Use Committee, Board of Supervisors, and Sup. Stefani,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. I'm concerned about a couple of issues in the way the proposal is written.

1. The definition of an "all-electric building or project" should start with a clear statement that no natural gas is allowed to be installed in a building or project unless an exception is granted for the public good. The specific examples should be illustrations, not constitutive of the definition. That approach creates possibilities for loopholes.
2. Exceptions for Mixed-Fuel Buildings. It should be specified that the Building Official's finding that there are grounds for granting an exception to permit the construction of a new Mixed-Fuel building must result from a public process. There is a significant possibility for doubts to arise about the legitimacy of the grant of exception if it is granted without public observation.

Thank you.

Carol Brownson
cdbrownson@gmail.com
2309 California St.
San Francisco, California 94115

From: Miles Navid-Oster
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Stefani, Catherine (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Friday, September 18, 2020 1:18:06 PM

Land Use Committee, Board of Supervisors, and Sup. Stefani,

I'm a resident of the city of SF writing to strongly support prohibiting gas in new construction projects.The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. As an architect working in new construction in the city, builders and contractors in the area are competent and knowledgeable in other methods of sustainable energy supply and this would not be a dramatic transition. San Francisco can lead the state and the country in building a better future. In 10-15 years we will see that this should have happened years sooner and it will be a missed opportunity. It is already past the environmental-deadline to maintain our way of life, we need drastic action and immediate policy change to secure a future for our planet and our future generations.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board:

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

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5. Amend section 106A.1.17 to require that the Building Official find “sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of residents and climate.

Miles Navid-Oster
mnavidoster@gmail.com
307 Austin St. #A
San Francisco , California 94109

From:	Beverly Tharp
To:	Major, Erica (BOS)
Cc:	Ronen, Hillary; Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Friday, September 18, 2020 12:47:11 PM

Re: New construction gas ban

Hello,

Since 1980 I've lived in Bernal Heights. In 1989 we had a major earthquake.
Even though nothing was damaged it was frightening. We felt it and the after shocks.
Our windows bowed and we smelled gas.
Everyone's main concern was the gas lines.
People turned off their gas even though the meters weren't spinning.
People freaked out! Then a few days later they turned the meters on without PG&E's help!
A major no-no, but they wanted their gas.
We don't need that kind of craziness in an Earthquake One Zone.

On an everyday basis methane leaks from gas are a huge source of pollution.
Why would we want to continue this since it's no longer necessary?

Please support the work of SF Climate Emergency Coalition.
We are truly in an emergency!

Their recommendations should be followed to strengthen the ordinance so that it isn't bypassed for short term expediency.
As the daughter of a developer I understand the construction industry's imperatives.
But they can work for the best outcomes if that's what is asked of them.

Thank you for your consideration.

Sincerely,

Beverly Tharp

From:	Sandra Mack
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Friday, September 18, 2020 12:44:52 PM

Land Use Committee, Board of Supervisors, and Sup. Preston,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sandra Mack
SAndrasanfran@aol.com
541 Page St
San Francisco, California 94117

From:	Georgie Teuten
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Friday, September 18, 2020 11:41:57 AM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Georgie Teuten
ghteuten@gmail.com
400 Duboce Ave
San Francisco, California 94117

From:	Delaney Chambers
To:	Major, Erica (BOS)
Cc:	Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); Stefani, Catherine (BOS)
Subject:	Concern from SF Neighbor Regarding BoS File 200701
Date:	Friday, September 18, 2020 11:39:47 AM

Hi,

My name's Delaney, I moved to San Francisco 6 years ago for a lot of reasons but the primary one being that I love the culture of diversity, care, and appreciation for the planet. The secondary reason is because I got a job out here, in construction. So I feel equipped to state that I strongly support prohibiting gas in new construction.

San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

Thank you for taking up this important issue and considering the health and safety of our residents and climate. I look forward to hearing the results of Monday's meeting

Best,

Delaney Chambers (she/her)
dischambers@gmail.com
301-221-7998 | **LinkedIn**

From: Amelia Jones
To: Major, Erica (BOS)
Cc: Stefani, Catherine (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject: Public Comment Re: BoS File 200701
Date: Friday, September 18, 2020 10:52:52 AM

To the San Francisco Board of Directors,
My name is Amelia and I'm a resident of San Francisco, living in Supervisor District 2, writing to strongly support prohibiting natural gas in new construction. After living through the horribly oppressive air pollution generated by nearby, climate-change-exacerbated wildfires these last few weeks, it cannot be more plainly crucial than it is now that San Francisco, often looked to globally as a city on the forefront of pro-climate policy, take strong action against the continued burning of fossil fuels.

Once touted as a "bridge" to renewable energy, the myth that natural gas can power us through to the renewable revolution has been widely debunked. Not only does the burning of natural gas contribute methane emissions to our atmosphere, the methane leaks during extraction, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco has a prime opportunity to lead the state, the country, and the world in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. **Eliminate the feasibility exception** to the electric-ready requirement and **make fully electric-ready construction a baseline requirement for new construction**. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. **Create a Clean Energy Building Hub** through the City and County of San Francisco that provides for the **outreach, resources, and education needed to eliminate barriers and maximize opportunity** for all-electric new construction to benefit both climate and equity.

3. **Expand the ordinance's definition of "mixed-fuel buildings"** to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. **It's wrong to harm public health for private enjoyment.**

4. **Provide additional limitations and transparency in the exemption process** to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need to shine

a light on the exemption process, and **exemptions should only be given in the public interest.**

5. **Amend section 106A.1.17** to require that the Building Official find “sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. **The space taken up by a transformer should not be an acceptable reason for an exemption.**

6. **Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022.** Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate. I look forward to following the Land Use Committee of the Board of Supervisors discussions around this new legislation beginning on Monday.

Sincerely,

Amelia T. Jones
amelia.jones735@gmail.com
1865 Chestnut St
San Francisco, CA 94123
m. (443) 844-4424

From:	Rebecca Barker
To:	Major, Erica (BOS); Peskin, Aaron (BOS); Angulo, Sunny (BOS); Hepner, Lee (BOS); Safai, Ahsha (BOS); Sandoval, Suhagey (BOS); Preston, Dean (BOS); Snyder, Jen (BOS); Smeallie, Kyle (BOS); Mandelman, Rafael (BOS); Bintliff, Jacob (BOS); MandelmanStaff, [BOS]; Board of Supervisors, (BOS)
Cc:	dktahara@gmail.com; c@n-a-s-o.com; mvespa@earthjustice.org
Subject:	Environmental Organizations" Public Comment Supporting Ordinance 200701
Date:	Friday, September 18, 2020 9:34:16 AM
Attachments:	ATT00001.png Environmental Orgs Support for SF All Electric New Construction Ordinance.pdf

Hello,

Attached please find a public comment letter from a group of environmental organizations supporting Ordinance 200701, agenda item #1 on the Land Use and Transportation Committee's 9/21 meeting agenda. Please add this written comment to the Board of Supervisors record for the ordinance generally and for consideration by the Committee ahead of their upcoming meeting.

Thank you,
Rebecca Barker

Rebecca Barker
She/her/hers
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EARTHJUSTICE


September 18, 2020

VIA EMAIL

Erica Major
Assistant Clerk
Land Use and Transportation Committee
San Francisco Board of Supervisors
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To the Board of Supervisors Land Use and Transportation Committee:

We are writing to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Local jurisdictions across the state have amended their

reach codes or introduced ordinances to decarbonize their building sectors, and San Francisco has the opportunity to emerge as a leader in this movement by taking a strong stance against fossil fuels and requiring all-electric construction in all new building projects.

We commend Supervisor Mandelman and the numerous stakeholder groups he engaged for taking the initiative to develop and introduce this important legislation. In addition, to more fully realize the health, climate and economic benefits of electrification and ensure that any exemptions to this important requirement are under legitimately exceptional circumstances, we ask that the following changes be made to strengthen the ordinance and implementing regulations:

1) eliminate the feasibility exception to the electric-ready requirement;
2) create a Clean Energy Buildings Hub that evaluates equity and economic considerations and informs the creation of additional education and technical support resources for affected groups (e.g., small businesses, restaurants, affordable housing, contractors, workforce standards), maximizing opportunities and eliminating barriers to utilization of all-electric new construction to address climate and equity;
3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas;
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022.

The Ordinance Will Protect the Health and Safety of San Francisco Residents

Gas appliances in buildings make up a quarter of California's nitrogen oxide (NO_x) emissions from natural gas. NO_x is a precursor to ozone and particulate matter, which are key pollutants to curb in order to comply with state and federal ambient air quality standards. Electrifying buildings will help reduce NO_x and ground level ozone, improving *outdoor* air quality and benefiting public health. A recent study from the UCLA Fielding School of Public Health found that immediate replacement of all residential gas appliances with clean electric alternatives would result in 354 fewer deaths, 596 fewer cases of acute bronchitis, and 304 fewer cases of chronic bronchitis *annually* in California due to improvements in outdoor air quality alone—the monetized equivalent of $3.5 billion in health benefits per year.[1]

Electrification of fossil fuel appliances will also immediately improve *indoor* air quality and health. On average, Californians spend 68 percent of their time indoors, making indoor air quality a key determinant of human health.[2] The combustion of gas in household appliances produces harmful indoor air pollution, specifically nitrogen dioxide, carbon monoxide, nitric oxide, formaldehyde, acetaldehyde, and ultrafine particles, often in excess of the levels set out by

[1] Zhu, *et al., Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California*, UCLA Fielding School of Public Health (April 2020).
[2] Klepeis *et al., The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants*, J. EXPO. ANAL. ENVIRON. EPIDEMIOL., Vol. 11(3), 231-52 (2001).

the California Ambient Air Quality Standards and the National Ambient Air Quality Standards.[3, 4] The California Air Resources Board warns that "cooking emissions, especially from gas stoves, have been associated with increased respiratory disease."[5] Young children and people with asthma are especially vulnerable to indoor air pollution, and the negative health impacts associated with gas appliance use disproportionately affect low-income residents, who are often renters rather than homeowners and tend to live in smaller spaces, resulting in higher concentration of indoor air pollutants.[6]

Chronic exposure to air pollution has also been linked to poor health outcomes during the COVID-19 crisis.[7] A study from the Harvard T.H. Chan School of Public Health analyzed data from more than 3,000 counties across the United States to assess the link between long-term average exposure to air pollutants and COVID-19 death rates. The study found that "an increase of only y 1 μg/m3 in $PM_{2.5}$ is associated with an 8% increase in the COVID-19 death rate," meaning even small increases in long-term exposure to particulate matter can translate into significant increases in county-wide death rates from the virus.[8] This data is a stark reminder of the devastating effects that air pollution has on affected communities, and underscores the need for major urban centers like San Francisco both to uphold existing safeguards against air pollution and to take a strong stance moving forward to protect the health and safety of their residents.

The Ordinance is a Critical Step in Fighting the Climate Emergency

Stationary energy use represents a major source of greenhouse gas ("GHG") emissions, much of which comes from gas end uses, such as space and water heating. In *Residential Building Electrification in California*, E3 determined that "electrification is found to reduce total greenhouse gas emissions in single family homes by approximately 30 to 60 percent in 2020, relative to a natural gas-fueled home."[9] Moreover, "[a]s the carbon intensity of the grid decreases over time, these savings are estimated to increase to approximately 80 to 90 percent by 2050, including the impacts of upstream methane leakage and refrigerant gas leakage from air conditioners and heat pumps."[10]

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[3] *See, e.g.*, Logue *et al.*, *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, ENVIRON. HEALTH PERSP., Vol. 122(1), 43-50 (2014); Victoria Klug & Brett Singer, *Cooking Appliance Use in California Homes—Data Collected from a Web-based Survey*, LAWRENCE BERKELEY NATIONAL LABORATORY (Aug. 2011); John Manuel, *A Healthy Home Environment?* ENVIRON. HEALTH PERSP., Vol. 107(7), 352-57 (1999); Mullen *et al.*, *Impact of Natural Gas Appliances on Pollutant Levels in California Homes*, LAWRENCE BERKELEY NATIONAL LABORATORY (2012).
[4] Zhu, *et al.*, at 12-13.
[5] California Air Resources Board, *Combustion Pollutants* (last reviewed Jan. 19, 2017), https://www.arb.ca.gov/research/indoor/combustion.htm.
[6] Zhu, *et al.*, at 10.
[7] Wu, *et al.*, *Exposure to Air Pollution and COVID-19 Mortality in the United States: A Nationwide Cross-Sectional Study*, Harvard T.H. Chan School of Public Health (updated April 24, 2020).
[8] *Id.*
[9] E3, Residential Building Electrification in California at iv (Apr. 2019), https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf.
[10] *Id.*

Building electrification brings significant GHG reductions, not only due to the energy mix on the grid, which was, in PG&E's and CleanPowerSF's service territories, respectively, 85 and 89 percent carbon-free in 2018,[11] but also because heat pump technology is extraordinarily efficient. Rather than needing to generate heat through the combustion of fossil gas, heat pumps extract existing heat from the surrounding environment. Because electricity is used to move heat around rather than to create it, heat pump water heater ("HPWH") efficiency is far greater than 100 percent (energy services delivered are much greater than energy input). Accordingly, HPWHs use much less energy to heat water,[12] and HPWHs generate significantly less GHGs than even the most efficient gas water heating.[13]

Industry leaders have shown that all-electric construction is feasible for all building types, from single-family residences to large, commercial buildings.[14] For example, Stanford University has converted its campus from a system reliant on a fossil-fuel-based combined heat and power plant to a mix of grid-sourced electricity and an electric heat recovery system that uses heat pump technology to store thermal energy and to meet the campus's space and water heating needs, reducing the GHG impact of its roughly 12 million square feet of building stock by 68% below peak levels.[15] Similar all-electric retrofits and new construction have been adopted for large-scale corporate campuses like Tesla and Google, among others.[16] These resounding success stories support a comprehensive gas ban that covers all building types, avoiding a slow, piecemeal transition.

The Ordinance Will Develop the Local Workforce

Building electrification will also spur development of the local workforce for jobs that will be critical in California's broader energy transition. For example, in Sacramento Municipal Utility District territory, where all-electric buildings are quickly becoming the default for new developments, demand for specialized plumbers and HVAC technicians is expected to grow enormously. The region expects to install more than 300,000 heat pump space heaters in the next 15 to 20 years.[17] Additionally, a 2019 study from the UCLA Luskin Center for Innovation

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[11] PG&E, Corporate Responsibility and Sustainability Report: 2019, at 38. Available at: http://www.pgecorp.com/corp_responsibility/reports/2019/assets/PGE_CRSR_2019.pdf; CleanPowerSF Power Draft Power Content Label: 2018. Available at: https://www.cleanpowersf.org/s/2018-CleanPowerSF-PCL.pdf.

[12] See Pub. Util. Code § 397.6(k)(3) (a measure of SGIP success and impact is the "amount of energy reductions measured in energy value.").

[13] See Pub. Util. Code § 379.6(k)(1) (a measure of SGIP success and impact is the "amount of reductions of emissions of greenhouse gases.").

[14] Redwood Energy, *Zero Carbon Commercial Construction: An Electrification Guide for Large Commercial Buildings and Campuses* (2019). Available at: https://www.redwoodenergy.tech/wp-content/uploads/2019/09/Pocket-Guide-to-Zero-Carbon-Commercial-Buildings-2nd-Edition.pdf

[15] Stanford University, *Stanford Energy Systems Innovations Fact Sheet*. Available at: https://sustainable.stanford.edu/sites/default/files/SESI_Condensed_factsheet2017.pdf. *See also* Stanford University, *Energy and Climate Plan*. Available at: https://sustainable.stanford.edu/sites/default/files/E%26C%20Plan%202016.6.7.pdf.

[16] Redwood Energy, at 3-4.

[17] Justin Gerdes, *Experts Discuss the Biggest Barriers Holding Back Building Electrification*, Greentech Media (Sept. 19. 2018), https://www.greentechmedia.com/articles/read/here-are-some-of-the-biggest-barriers-holding-back-building-electrification#gs.fBEBKJy2.

found that electrification of 100 percent of California's existing and new buildings by 2045 would generate new jobs for more than 100,000 full time construction workers and up to 4,900 full time manufacturing workers.[18] While gas distribution jobs would decrease, they are projected to be replaced by almost double the amount of full time jobs in electricity generation and distribution.[19] Further, because California imports 90 percent of its natural gas from out of state, it can reduce gas imports first while preserving in-state gas industry jobs, which will ease the strain of industry transition on gas industry workers.[20] The UCLA study stresses that planning—including implementing and enforcing clear building codes and standards—will be crucial in protecting workers through an industry transition that is already underway.[21] Recognizing the widespread energy transition already underway statewide, San Francisco has an opportunity to lead California's major urban centers by developing a robust, comprehensive local legal framework to support electrification and generate thousands of good, green jobs for its residents.

In light of this, we commend the introduction of an all-electric construction ordinance, not only as a response to the climate emergency, but also in support of new jobs and the health and safety of the people of San Francisco. To fully realize these benefits, avoid unnecessary stranded asset consequences of continued buildout of gas infrastructure, and ensure the City's actions are commensurate with the urgency of the climate crisis, it is critical that any exemptions to all-electric new construction be as narrowly tailored as possible and avoid the potential for loopholes. We therefore urge the following modification to the ordinance and implemented code to ensure exemptions are in legitimately exceptional circumstances.

1. **Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction.** To avoid creating obstacles to future electrification, any new construction project that is found exempt from the all-electric requirement due to infeasibility must be required, as a baseline, to adhere to an electric-ready design, *i.e.*, to install sufficient electric service, conduit, and wiring to facilitate full building electrification in the future.

An electric-ready requirement as an interim step will ensure that developers do not push gas-reliant projects through the exemption process for physical infeasibility, which will ultimately be costly and burdensome to retrofit.

2. **Establish a Clean Energy Buildings Hub to support, connect, and train workers, contractors, building owners, facilities managers, technology vendors, and other interested parties, run by the City and County of San Francisco.** The hub would be a one-stop shop for electrification and fuel-switching, energy efficiency, water efficiency, solar technologies, and electric vehicle resources. Resources would be culturally

[18] UCLA Luskin Center for Innovation, *California Building Decarbonization: Workforce Needs and Recommendations*, at ES-iv (Nov. 2019).
[19] *Id.*
[20] *Id.* at 24-25.
[21] *Id.* at 27-28.

competent, multi-lingual, and accessible to all San Francisco residents. This recommendation is a result of the work of the San Francisco Department of Environment's Energy Efficiency Coordinating Committee and the Residential Building Electrification Task Force.

Potential elements could include, but are not limited to:

- A referral service for single trade contractors to partner on jobs and provide cross-trade training;
- Regional collaboration on building standards, such as reach codes, that vary by jurisdiction;
- Information about local and state distributed generation and energy efficiency programs providing financial and other support to low-income and marginalized communities;
- Collaboration between manufacturers and general contractors to identify opportunities to reduce the rising costs of construction, and develop group purchasing and contracting programs; and
- Opportunities for group purchasing of electrification technologies between residents/neighbors, with partnerships between the City and County of San Francisco and high quality manufacturers providing subsidies and bulk purchasing options.

3. **Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas.** As written, the definition of "mixed-fuel buildings" limits the application of the ordinance just to buildings using gas for "space heating or cooling, water heating (including pools and spas), cooking appliances or clothes drying appliances, [or] onsite generation of electricity," or buildings that contain "fixtures, piping systems, or infrastructure for natural gas or propane equipment *for such uses*." Amending this definition to include laboratory, industrial, and decorative uses of gas (e.g., outdoor fireplaces or lamps) will ensure comprehensive application of the ordinance, as intended, subject to the infeasibility exemption on a case-by-case basis.

4. **Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest.** The current proposed process for reviewing exemptions for physical infeasibility would take place behind closed doors with no opportunity for public comment or appeal. Without additional safeguards in place, developers may take advantage of the process to advance projects that do not serve the health and safety interests of the public, including the future workers and/or residents of the proposed development. A more transparent review process will enable public engagement and greater public confidence that exemptions are limited and made only in legitimately exceptional circumstances.

Further, amending section 106A.1.17 to require that that Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design *without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare*," would prevent developers from designing projects that claim physical infeasibility to avoid using space inside the building to house the

necessary equipment. This amendment ensures the focus remains on public health and welfare, rather than profit maximization for developers and landlords, while giving the Building Official discretion to determine case-specific exemptions that may serve the public interest.

5. **Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022.** Restaurant workers who spend hours working in commercial kitchens daily are at particularly high risk for the negative health effects of gas stoves. Additionally, because this ordinance affects only new construction, this exemption does not stand to benefit existing local small businesses, but rather, caters to developers seeking to build brand-new commercial spaces. This exemption does not protect the interests of the local restaurant owners and will delay the transition to a fully decarbonized building stock with no balancing benefit in the public interest. An all-electric requirement with no categorical exemptions or delays is commensurate with the urgency of the climate crisis.

Thank you for your leadership moving San Francisco forward in realizing the many benefits of healthy, fossil fuel free homes. Please do not hesitate to reach out if you have any questions, and please include us on your contact list for any further developments on the proposed ordinance.

Sincerely,

Earthjustice	San Francisco Climate Emergency Coalition
Alliance of Nurses for Healthy Environments	Physicians for Social Responsibility SF Bay Chapter
Climate Health Now	350 San Francisco
350 Bay Area	Integral Group
Sunflower Alliance	Food & Water Action
Mothers Out Front California	Redwood Energy
Ban Gas San Francisco	Sierra Club
Mothers Out Front San Francisco	Alter Consulting Engineers
Sunrise Movement - Bay Area	PIVOT: The Progressive Vietnamese American Organization
PODER: People Organizing to Demand Environmental and Economic Rights	North American Passive House Network

Passive House California

Citizens' Climate Lobby – San Francisco

Emerald Cities San Francisco

San Francisco Tomorrow

Sierra Club – SF Bay Chapter

Bay Area Living Future Collaborative

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Suhagey.Sandoval@sfgov.org
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mandelmanstaff@sfgov.org
Board.of.Supervisors@sfgov.org

From: Bill WEIHL
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Friday, September 18, 2020 9:33:51 AM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco in District 8 writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

I have spent the past 15 years of my career working on climate and clean energy in the tech industry - leading sustainability work first for Google and then for Facebook. I am now running a non-profit, ClimateVoice, focused on getting companies to do more on climate. The climate crisis is urgent, and no longer remote in time or space - it is affecting us here and now. I am worried about our immediate future, and also the future we are leaving for our children and grandchildren. We must stop expanding our use of gas and other fossil fuels now - and then work over the next decade or two to phase them out completely.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the

news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find “sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Bill WEIHL
bill@weihl.com
280 Clipper Street
San Francisco, California 94114

From:	Bharath Kumandan
To:	Major, Erica (BOS)
Cc:	Haney, Matt (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject:	Public Comment Re: BoS File 200701
Date:	Thursday, September 17, 2020 11:00:30 PM

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sincerely,

Bharath Kumandan

481 Clementina St., Unit D, San Francisco, CA 94103

From: Bonnie Hu
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Thursday, September 17, 2020 9:27:08 PM

Land Use Committee, Board of Supervisors, and Sup. Peskin,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Bonnie Hu
bonnieyhu@gmail.com
1001 Pine Street Unit 608
San Francisco, California 94109

From:	Stephen Reichling
To:	Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject:	Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date:	Thursday, September 17, 2020 5:40:27 PM

Land Use Committee, Board of Supervisors, and Sup. Preston,

I'm a resident of San Francisco and a constituent of Supervisor Dean Preston. I'm writing to voice my strong support of prohibiting gas in new construction. It's essential step to cutting one of San Francisco's major sources of the type of greenhouse gas emissions that drive the wildfires. Not only do these fires make our air unbreathable, they have forced thousands of Californians to evacuate homes, worsening the housing crisis and furthering the spread of the coronavirus. We are long past being able to kick this problem further down the road.

Additionally, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Stephen Reichling
smreichling@gmail.com
78 Parnassus Ave
San Francisco, California 94117

From:	Lucy Duan
To:	Major, Erica (BOS)
Cc:	Walton, Shamann (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject:	Public Comment Re: BoS File 200701
Date:	Thursday, September 17, 2020 4:23:33 PM

Dear Supervisors,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Sincerely,

Lucy Duan

210 Arkansas St San Francisco

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Lucy Duan
yunxiduan@gmail.com
+1 (773) 510 7728

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

September 21, 2020

Erica Major
Assistant Clerk
Land Use and Transportation Committee
San Francisco Board of Supervisors
1455 Market Street, Suite 1200
San Francisco, CA 94103
Erica.Major@sfgov.org

Re: File #200701 – All-Electric New Construction Ordinance

Dear Ms. Major,

On behalf of Earthjustice, I submit the following letters from Earthjustice supporters urging the San Francisco Board of Supervisors to approve an all-electric building standard for all new construction in the City of San Francisco. The devastating consequences of decades of obstruction by the fossil fuel industry on meaningful measures to address the climate crisis are now upon us. The time has arrived to take comprehensive, decisive action to protect the health and safety of our communities and to significantly reduce our city's contributions to the climate crisis. Thank you for your consideration of these letters, and for moving forward with this crucial policy.

Sincerely,

Rebecca Barker
Associate Attorney
Earthjustice

CC: Board.of.Supervisors@sfgov.org

From:	Rebecca Barker
To:	Major, Erica (BOS); Board of Supervisors, (BOS)
Subject:	File No. 200701 Public Comments from 71 SF Residents
Date:	Monday, September 21, 2020 9:35:05 AM
Attachments:	ATT00001.png Attachment A_Messages from Earthjustice Supporters on SF All Electric Ordinance.pdf Cover Letter_SF Residents Support for 200701.pdf

Hello,

Please find attached cover letter and Attachment A, which includes letters from 71 San Francisco residents in support of a comprehensive all-electric new construction ordinance for the City of San Francisco. Please add these documents to the record for Board File Number 200701.

Thank you,
Rebecca Barker

Rebecca Barker
She/her/hers
Associate Attorney
Clean Energy Program
50 California Street, Suite 500
San Francisco, CA 94111
Phone: 415.217.2056
rbarker@earthjustice.org

-- *Sent from **Kyle Berquist** to **Supervisor Dean Preston** on Sep 15, 2020* --

My name is Kyle Berquist, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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While I am in full support of this ordinance, I ask that, to more fully realize the health, climate and economic benefits of electrification and ensure that any exemptions to this important requirement are under legitimately exceptional circumstances, the following changes be made to strengthen the ordinance and implementing regulations:

1) eliminate the feasibility exception to the electric-ready requirement;
2) create a Clean Energy Buildings Hub that evaluates equity and economic considerations and informs the creation of additional education and technical support resources for affected groups (e.g., small businesses, restaurants, affordable housing, contractors, workforce standards), maximizing opportunities and eliminating barriers to utilization of all-electric new construction to address climate and equity;
3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas;
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
Kyle Berquist
1338 Haight St
San Francisco, CA 94117

-- *Sent from* ***Anna Shurter*** *to* ***Supervisor Catherine Stefani*** *on Sep 16, 2020* --

My name is Anna Shurter, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Anna Shurter
306 Avila St
San Francisco, CA 94123

-- *Sent from* ***Robert Cambra*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Robert Cambra, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Robert Cambra
265 Glenview Dr
San Francisco, CA 94131

-- *Sent from* ***Mike Andrewjeski*** *to* ***Supervisor Sandra Fewer*** *on Sep 16, 2020* --

My name is Mike Andrewjeski, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Mike Andrewjeski
442 44th Ave
San Francisco, CA 94121

-- *Sent from* ***Carly Quaglio*** *to* ***Supervisor Dean Preston*** *on Sep 16, 2020* --

My name is Carly Quaglio, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Carly Quaglio
16790 Watson Rd
Guerneville, CA 95446

-- *Sent from* ***eugenio jardim*** *to* ***Supervisor Matt Haney*** *on Sep 16, 2020* --

My name is eugenio jardim, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
eugenio jardim
95 McCoppin St
San Francisco, CA 94103

-- *Sent from* ***William Werle*** *to* ***Supervisor Gordon Mar*** *on Sep 16, 2020* --

My name is William Werle, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
William Werle
1615 44th Ave
San Francisco, CA 94122

-- *Sent from* ***Charles Calhoun*** *to* ***Supervisor Catherine Stefani*** *on Sep 16, 2020* --

My name is Charles Calhoun, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Charles Calhoun
2459 Post St
San Francisco, CA 94115

-- *Sent from* ***Gregory Coyle*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Gregory Coyle, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Gregory Coyle
14 Ford St
San Francisco, CA 94114

-- *Sent from **Ivan Rhudick** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is Ivan Rhudick, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Ivan Rhudick
251 5th Ave
San Francisco, CA 94118

-- *Sent from **Jerushah Ismail** to **Supervisor Aaron Peskin** on Sep 16, 2020* --

My name is Jerushah Ismail, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Jerushah Ismail
1765 Mason St
San Francisco, CA 94133

-- *Sent from **Brittny Oconnor** to **Supervisor Ahsha Safai** on Sep 16, 2020* --

My name is Brittny Oconnor, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Brittny Oconnor
375 Trumbull St
San Francisco, CA 94112

-- *Sent from **Kathryn Hyde** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is Kathryn Hyde, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

Natural gas combustion in buildings is responsible for a large portion of our city's carbon emissions, which is why we can't afford to delay. Fully electrifying a single house can reduce its carbon emissions by up to 90% depending on how clean the grid is. We are lucky in San Francisco to get most of our energy from carbon-free sources, meaning we get more bang for our buck when we electrify our homes.

While I am in full support of this ordinance, I ask that, to more fully realize the health, climate and economic benefits of electrification and ensure that any exemptions to this important requirement are under legitimately exceptional circumstances, the following changes be made to strengthen the ordinance and implementing regulations:

1) eliminate the feasibility exception to the electric-ready requirement;
2) create a Clean Energy Buildings Hub that evaluates equity and economic considerations and informs the creation of additional education and technical support resources for affected groups (e.g., small businesses, restaurants, affordable housing, contractors, workforce standards), maximizing opportunities and eliminating barriers to utilization of all-electric new construction to address climate and equity;
3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas;
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
Kathryn Hyde
4611 California St
San Francisco, CA 94118

-- *Sent from* ***Libby Ingalls*** *to* ***Supervisor Catherine Stefani*** *on Sep 16, 2020* --

My name is Libby Ingalls, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Libby Ingalls
2565 Washington St
San Francisco, CA 94115

-- *Sent from* ***nick wolf*** *to* ***Supervisor Sandra Fewer*** *on Sep 16, 2020* --

My name is nick wolf, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
nick wolf
201 5th Ave
San Francisco, CA 94118

-- *Sent from **Virginia Sturken** to **Supervisor Gordon Mar** on Sep 16, 2020* --

My name is Virginia Sturken, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Virginia Sturken
1930 Vicente St
San Francisco, CA 94116

-- *Sent from* ***Pauline Kahney*** *to* ***Supervisor Dean Preston*** *on Sep 16, 2020* --

My name is Pauline Kahney, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Pauline Kahney
77 Grove St
San Francisco, CA 94102

-- *Sent from **Karen Dega** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is Karen Dega, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Karen Dega
738 6th Ave
San Francisco, CA 94118

-- *Sent from* ***Mark Lozano*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Mark Lozano, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Mark Lozano
211 30th St
San Francisco, CA 94110

-- *Sent from **LaVive Kiely** to **Supervisor Norman Yee** on Sep 16, 2020* --

My name is LaVive Kiely, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
LaVive Kiely
1420 Portola Dr
San Francisco, CA 94127

-- *Sent from* ***Mike Kappus*** *to* ***Supervisor Matt Haney*** *on Sep 16, 2020* --

My name is Mike Kappus, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Mike Kappus
650 Delancey St
San Francisco, CA 94107

-- *Sent from* ***Roberto Varea*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Roberto Varea, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Roberto Varea
668 29th St
San Francisco, CA 94131

-- *Sent from **Maxine Zylberberg** to **Supervisor Rafael Mandelman** on Sep 16, 2020* --

My name is Maxine Zylberberg, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Maxine Zylberberg
32 Dearborn St
San Francisco, CA 94110

-- *Sent from* ***John Steponaitis*** *to* ***Supervisor Matt Haney*** *on Sep 16, 2020* --

My name is John Steponaitis, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
John Steponaitis
910 Geary Blvd
San Francisco, CA 94109

-- *Sent from **Marsha Seeley** to **Supervisor Dean Preston** on Sep 16, 2020* --

My name is Marsha Seeley, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
Marsha Seeley
12-7134 Waioleka St
Pahoa, HI 96778

-- *Sent from* ***Josephine Coffey*** *to* ***Supervisor Ahsha Safai*** *on Sep 16, 2020* --

My name is Josephine Coffey, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Josephine Coffey
248 Dublin St
San Francisco, CA 94112

-- *Sent from* ***Kathleen Weckenman*** *to* ***Supervisor Ahsha Safai*** *on Sep 16, 2020* --

My name is Kathleen Weckenman, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Kathleen Weckenman
89 Ina Ct
San Francisco, CA 94112

-- *Sent from* ***Katherine Roberts*** *to* ***Supervisor Dean Preston*** *on Sep 16, 2020* --

My name is Katherine Roberts, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Katherine Roberts
199 Beulah St
San Francisco, CA 94117

-- *Sent from* ***Susan Mehrings*** *to* ***Supervisor Dean Preston*** *on Sep 16, 2020* --

My name is Susan Mehrings, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Susan Mehrings
1240 Hayes St
San Francisco, CA 94117

-- *Sent from* ***Lisa Kellman*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Lisa Kellman, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Lisa Kellman
474 Day St
San Francisco, CA 94131

-- *Sent from **Jc Sarmiento** to **Supervisor Hillary Ronen** on Sep 16, 2020* --

My name is Jc Sarmiento, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Jc Sarmiento
109 Bartlett St
San Francisco, CA 94110

-- *Sent from* ***Dana Landis*** *to* ***Supervisor Rafael Mandelman*** *on Sep 16, 2020* --

My name is Dana Landis, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Dana Landis
401 30th St
San Francisco, CA 94131

-- *Sent from **NATASHA Hopkinson** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is NATASHA Hopkinson, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
NATASHA Hopkinson
542 29th Ave
San Francisco, CA 94121

-- *Sent from **Linda Bellavia** to **Supervisor Catherine Stefani** on Sep 16, 2020* --

My name is Linda Bellavia, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Linda Bellavia
2698 California St
San Francisco, CA 94115

-- *Sent from* ***Christopher Aycock*** *to* ***Supervisor Gordon Mar*** *on Sep 16, 2020* --

My name is Christopher Aycock, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Christopher Aycock
2663 24th Ave
San Francisco, CA 94116

-- *Sent from **Martha Larsen** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is Martha Larsen, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Martha Larsen
828 30th Ave
San Francisco, CA 94121

-- *Sent from **Janny Hazelaar** to **Supervisor Rafael Mandelman** on Sep 16, 2020* --

My name is Janny Hazelaar, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Janny Hazelaar
1040 Ashbury St
San Francisco, CA 94117

-- *Sent from* ***David Gemigniani*** *to* ***Supervisor Gordon Mar*** *on Sep 16, 2020* --

My name is David Gemigniani, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas;
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
David Gemigniani
1285 44th Ave
San Francisco, CA 94122

-- *Sent from* ***Michael Lamperd*** *to* ***Supervisor Gordon Mar*** *on Sep 16, 2020* --

My name is Michael Lamperd, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Michael Lamperd
4611 Lincoln Way
San Francisco, CA 94122

-- *Sent from **Ellen Koivisto** to **Supervisor Gordon Mar** on Sep 16, 2020* --

My name is Ellen Koivisto, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Ellen Koivisto
1556 Great Hwy
San Francisco, CA 94122

-- *Sent from* ***Josh Brockmann*** *to* ***Supervisor Dean Preston*** *on Sep 16, 2020* --

My name is Josh Brockmann, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Josh Brockmann
1447 McAllister St
San Francisco, CA 94115

-- *Sent from **m r** to **Supervisor Catherine Stefani** on Sep 16, 2020* --

My name is m r, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
m r
320 10th Ave
San Francisco, CA 94118

-- *Sent from* ***Marie Mika*** *to* ***Supervisor Gordon Mar*** *on Sep 16, 2020* --

My name is Marie Mika, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Marie Mika
2414 47th Ave
San Francisco, CA 94116

-- *Sent from **Linda Sherwood** to **Supervisor Sandra Fewer** on Sep 16, 2020* --

My name is Linda Sherwood, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Linda Sherwood
523 22nd Ave
San Francisco, CA 94121

-- *Sent from* ***Denise Peck*** *to* ***Supervisor Hillary Ronen*** *on Sep 17, 2020* --

My name is Denise Peck, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Denise Peck
2130 Harrison St
San Francisco, CA 94110

-- *Sent from* ***David Thompson*** *to* ***Supervisor Rafael Mandelman*** *on Sep 17, 2020* --

My name is David Thompson, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
David Thompson
920 Diamond St
San Francisco, CA 94114

-- *Sent from **Sarah M** to **Supervisor Norman Yee** on Sep 17, 2020* --

My name is Sarah M, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Sarah M
744 Pacheco St
San Francisco, CA 94116

-- *Sent from* ***Van Rookhuyzen*** *to* ***Supervisor Matt Haney*** *on Sep 18, 2020* --

My name is Van Rookhuyzen, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Van Rookhuyzen
145 Taylor St
San Francisco, CA 94102

-- *Sent from* ***Emma Cervantes*** *to* ***Supervisor Dean Preston*** *on Sep 18, 2020* --

My name is Emma Cervantes, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Emma Cervantes
49 Beideman St
San Francisco, CA 94115

-- *Sent from **Kay Weber** to **Supervisor Matt Haney** on Sep 18, 2020* --

My name is Kay Weber, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
Kay Weber
111 Jones St
San Francisco, CA 94102

-- *Sent from* ***Constance Walker*** *to* ***Supervisor Dean Preston*** *on Sep 18, 2020* --

My name is Constance Walker, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

Natural gas combustion in buildings is responsible for a large portion of our city's carbon emissions, which is why we can't afford to delay. Fully electrifying a single house can reduce its carbon emissions by up to 90% depending on how clean the grid is. We are lucky in San Francisco to get most of our energy from carbon-free sources, meaning we get more bang for our buck when we electrify our homes.

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Regards,
Constance Walker
709 Frederick St
San Francisco, CA 94117

-- *Sent from* ***Tamara Straus*** *to* ***Supervisor Shamann Walton*** *on Sep 18, 2020* --

My name is Tamara Straus, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Tamara Straus
477 Vermont St
San Francisco, CA 94107

-- *Sent from **Lynn Shauinger** to **Supervisor Dean Preston** on Sep 18, 2020* --

My name is Lynn Shauinger, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Lynn Shauinger
941 Oak St
San Francisco, CA 94117

-- *Sent from* ***Jonathan Albizures*** *to* ***Supervisor Rafael Mandelman*** *on Sep 18, 2020* --

My name is Jonathan Albizures, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Jonathan Albizures
66 Corwin St
San Francisco, CA 94114

-- *Sent from* ***Rachel Hinojosa*** *to* ***Supervisor Hillary Ronen*** *on Sep 18, 2020* --

My name is Rachel Hinojosa, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Rachel Hinojosa
130 Kingston St
San Francisco, CA 94110

-- *Sent from **Karla Robinson** to **Supervisor Catherine Stefani** on Sep 18, 2020* --

My name is Karla Robinson, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Karla Robinson
2831 Pine St
San Francisco, CA 94115

-- *Sent from* ***Michelle Ghafar*** *to* ***Supervisor Norman Yee*** *on Sep 18, 2020* --

My name is Michelle Ghafar, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because I'm a lifelong California resident who cares deeply about tackling air pollution and climate change.

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Michelle Ghafar
2376 16th Ave
San Francisco, CA 94116

-- *Sent from **Jill Fitzsimmons** to **Supervisor Catherine Stefani** on Sep 18, 2020* --

My name is Jill Fitzsimmons, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Jill Fitzsimmons
1101 Francisco St
San Francisco, CA 94109

-- *Sent from* ***Marie Logan*** *to* ***Supervisor Dean Preston*** *on Sep 18, 2020* --

My name is Marie Logan, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Marie Logan
155 Page St
San Francisco, CA 94102

-- *Sent from* ***Dalton Fusco*** *to* ***Supervisor Sandra Fewer*** *on Sep 18, 2020* --

My name is Dalton Fusco, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Dalton Fusco
646 10th Ave
San Francisco, CA 94118

-- *Sent from* ***Lev Malevanchik*** *to* ***Supervisor Dean Preston*** *on Sep 18, 2020* --

My name is Lev Malevanchik, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Lev Malevanchik
155 Page St
San Francisco, CA 94102

-- *Sent from* ***Saideh Morales*** *to* ***Supervisor Gordon Mar*** *on Sep 18, 2020* --

My name is Saideh herrera and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Saideh Morales
1550 48th Ave
San Francisco, CA 94122

-- *Sent from* ***Sarah Davis*** *to* ***Supervisor Ahsha Safai*** *on Sep 18, 2020* --

My name is Sarah Davis, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

Natural gas combustion in buildings is responsible for a large portion of our city's carbon emissions, which is why we can't afford to delay. Fully electrifying a single house can reduce its carbon emissions by up to 90% depending on how clean the grid is. We are lucky in San Francisco to get most of our energy from carbon-free sources, meaning we get more bang for our buck when we electrify our homes.

While I am in full support of this ordinance, I ask that, to more fully realize the health, climate and economic benefits of electrification and ensure that any exemptions to this important requirement are under legitimately exceptional circumstances, the following changes be made to strengthen the ordinance and implementing regulations:

1) eliminate the feasibility exception to the electric-ready requirement;
2) create a Clean Energy Buildings Hub that evaluates equity and economic considerations and informs the creation of additional education and technical support resources for affected groups (e.g., small businesses, restaurants, affordable housing, contractors, workforce standards), maximizing opportunities and eliminating barriers to utilization of all-electric new construction to address climate and equity;
3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas;
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest; and
5) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;

California is burning and our air is unbreathable. There is no more time -- we need bold climate action now. Every building that goes up in San Francisco with gas hookups is just one more building we will have to retrofit for electric heating and appliances later. The prudent thing to do -- for our climate, health, and wallets -- is to make sure we aren't digging a deeper hole for ourselves and enact the strongest building electrification ordinance possible. Please support Supervisor Mandelman's ordinance and make San Francisco a climate action leader.

Regards,
Sarah Davis
742 Avalon Ave
San Francisco, CA 94112

-- *Sent from* ***Val laurent*** *to* ***Supervisor Aaron Peskin*** *on Sep 18, 2020* --

My name is Val laurent, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Val laurent
1680 Clay St
San Francisco, CA 94109

-- *Sent from **Miranda Fox** to **Supervisor Rafael Mandelman** on Sep 18, 2020* --

My name is Miranda Fox, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Miranda Fox
396 San Jose Avenue
San Francisco, CA 94110

-- *Sent from **Kylie Cobb** to **Supervisor Catherine Stefani** on Sep 18, 2020* --

My name is Kylie Cobb, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Kylie Cobb
2085 Sacramento St
San Francisco, CA 94109

-- *Sent from* ***Maria Hilario*** *to* ***Supervisor Aaron Peskin*** *on Sep 18, 2020* --

My name is Maria Hilario, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Maria Hilario
72 Lynch St
San Francisco, CA 94109

-- *Sent from* ***Jesse DeRose*** *to* ***Supervisor Rafael Mandelman*** *on Sep 19, 2020* --

My name is Jesse DeRose, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Jesse DeRose
3828 17th St
San Francisco, CA 94114

-- *Sent from* ***Macy McCallister*** *to* ***Supervisor Catherine Stefani*** *on Sep 19, 2020* --

My name is Macy McCallister, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Macy McCallister
2418 Washington St
San Francisco, CA 94115

-- *Sent from **Celia Peachey** to **Supervisor Aaron Peskin** on Sep 20, 2020* --

My name is Celia Peachey, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

The health and climate impacts of continued natural gas use are severe. Children are 42% more likely to develop asthma in homes with gas stoves compared to homes without gas stoves. It's not just asthma -- studies show that replacing gas appliances with electric versions would save hundreds of lives annually in California. We need San Francisco to be a leader on this issue that the rest of the state can follow.

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Regards,
Celia Peachey
1746 Hyde St
San Francisco, CA 94109

-- *Sent from* ***Shelley Kuang*** *to* ***Supervisor Shamann Walton*** *on Sep 20, 2020* --

My name is Shelley Kuang, and as your constituent I urge you to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Support for this ordinance is strong in my neighborhood, as we strongly believe that the Board of Supervisors needs to do everything it can to protect public health and reduce carbon emissions. This issue is personal to me because

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Regards,
Shelley Kuang
235 Paul Ave
San Francisco, CA 94124

From:	Joni
To:	Major, Erica (BOS)
Cc:	Walton, Shamann (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS)
Subject:	Comment Re: BoS File 200701
Date:	Monday, September 21, 2020 12:25:35 PM

As a resident of District 10 in San Francisco, I strongly support prohibiting gas in ALL new construction. The air pollution from methane gas adds to the chemical burdens already experienced by so many in my district, especially in Bayview/Hunters Point. And the possibility of leaks and explosions scares me. As a baker, I have personally experienced mini-explosions In two different natural-gas ovens, and it was really scary. I replaced those stoves, but alas, each time with another gas-powered one.

I now use a portable induction electric cooktop, which I love for its safety, efficiency, speed, and coolness (in both senses). But because of the expense of rewiring my 125-year-old house, we cannot begin to afford to replace the gas stove - let alone the gas water heater. So this message is also a plea to look to the future, when we will have to retrofit ALL buildings in the City to get rid of natural gas once and for all: People will need incentives, rebates, education - and this will require massive funding. Yes we are in a health crisis from Covid 19 - but there will never be a vaccine for climate change.

Therefore I also support the creation, now, of a Clean Energy Buildings Hub - as recommended by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board - that evaluates equity and economic considerations and facilitates the creation of additional education and technical support resources for affected groups (e.g., small businesses, restaurants, affordable housing, contractors, workforce standards), maximizing opportunities and eliminating barriers to utilization of all-electric new construction to address climate and equity.

This ordinance is a very important beginning in eliminating emissions from buildings, because obviously building more gas infrastructure will only exacerbate climate change. That's why any exception to the all-electric requirement under this ordinance must:

- be fully, 100% electric-ready, to facilitate future electrification and eliminate the huge expense of a retrofit;
- include in the ordinance's definition of "mixed-fuel buildings" laboratory, industrial, and decorative uses of gas
- be transparent in its process and truly in the public interest.

Thank you for your consideration.

Sincerely,

Joni Eisen
592 Pennsylvania

From:	Mchugh, Eileen (BOS)
To:	Major, Erica (BOS)
Subject:	FW: SUPPORTING Land Use and Transportation Committee Agenda Item #1 Building Code - Mandating New Construction Be All Electric File #200701
Date:	Monday, September 21, 2020 4:21:50 PM

From: aeboken <aeboken@gmail.com>
Sent: Saturday, September 19, 2020 5:33 PM
To: BOS-Supervisors <bos-supervisors@sfgov.org>; BOS-Legislative Aides <bos-legislative_aides@sfgov.org>
Subject: SUPPORTING Land Use and Transportation Committee Agenda Item #1 Building Code - Mandating New Construction Be All Electric File #200701

TO: Board of Supervisors members

I am strongly supporting changes to the Building Code which would mandate that new construction be all-electric.

This would provide both safety and environmental benefits.

Eileen Boken
Coalition for San Francisco Neighborhoods*

* For identification purposes only.

From: Hans von Clemm
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Monday, September 21, 2020 3:19:18 PM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for

an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Hans von Clemm
hansvc95@gmail.com
20 Flint Street
San Francisco, California 94114

From: Cecilia Palmtag
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Monday, September 21, 2020 3:03:53 PM

Land Use Committee, Board of Supervisors, and Sup. Mandelman,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

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Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Cecilia Palmtag
cecilia.palmtag@gmail.com
120 Clinton Park
San Francisco, California 94103

From: Maura Fallon-McKnight
To: Major, Erica (BOS)
Subject: Support for Proposed Ordinance: Mandating New Construction Be All-Electric
Date: Monday, September 21, 2020 2:59:17 PM

Regarding: Building Code - Mandating New Construction Be All-Electric; **Sponsor:** Mandelman

Hello -

I had an opportunity to speak today in support of this ordinance and I may have been cut off before I specifically said that our organization strongly supports this ordinance. My name is Maura McKnight and I am the Executive Director of the Business Council on Climate Change based in San francisco. http://www.bc3sfbay.org/

Our organization strongly supports this proposed ordinance.

Founded in 2007, BC3 is a membership-driven nonprofit of corporate sustainability leaders implementing and championing tangible climate action.
Our members are a major economic engine for the region and employ more than 750,000 people.

This legislation is a bold step on climate and I applaud all of the individuals and groups that have worked on it to date.

Many of our member companies have set carbon neutral and net zero emissions goals that align with the City of SF's bold pledge to zero out emissions by 2050.

Some of our members have even set "carbon negative" targets - meaning they plan to go beyond zeroing out their emissions and invest in new approaches to carbon reduction, capture, and removal technologies

All of us who live in the Bay Area and have just been reminded of the very real impacts of the climate emergency we are facing - with disastrous effects for health during a pandemic. The time to act boldly is now.

Our members are leaders in this space and they have been doing electrification pilot projects both locally in San Francisco and abroad because they know that this is key to meeting our global and local climate goals.
- Natural gas is a fossil fuel super-pollutant that is 86 times more potent than carbon dioxide.

The Business Council on Climate Change strongly supports this proposed legislation.

Thank you.

Maura McKnight
Executive Director
Business Council on Climate Change
Cell 415.350.7652; www.bc3sfbay.org

From: Dave Rhody
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Mar, Gordon (BOS)
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Monday, September 21, 2020 1:24:41 PM

Land Use Committee, Board of Supervisors, and Sup. Mar,

I'm a resident of San Francisco and an Climate Reality Leader. I and my climate colleagues strongly support building decarbonization in SF. Prohibiting gas in new construction is the first step. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

1. Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction. We know that the future is electric. Allowing any building to be built that will require massive retrofits in the near future is unacceptable. With full electric readiness, we minimize that retrofit cost.

2. Create a Clean Energy Building Hub through the City and County of San Francisco that provides for the outreach, resources, and education needed to eliminate barriers and maximize opportunity for all-electric new construction to benefit both climate and equity.

3. Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas. Gas shouldn't be allowed for upscale decorative uses. It's wrong to harm public health for private enjoyment.

4. Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest. I'm concerned about the news of powerful and connected people being able to get favors from DBI. We need sunshine on the exemption process, and exemptions should only be given in the public interest.

5. Amend section 106A.1.17 to require that the Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare." The housing crisis is real. And we need to find ways of fixing it without sacrificing our children's future. The space taken up by a transformer should not be an acceptable reason for an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you.

Dave Rhody
dave@rhodyco.com
1594 45th Ave.
San Francisco, California 94122

From: Cate Levey
To: Major, Erica (BOS); Board of Supervisors, (BOS); Preston, Dean (BOS); Peskin, Aaron (BOS); Safai, Ahsha (BOS); MandelmanStaff, [BOS]; Ronen, Hillary
Subject: Public Comment Re: BoS File 200701 (Item 1 of 9/21 Land Use)
Date: Monday, September 21, 2020 11:03:58 AM

Land Use Committee, Board of Supervisors, and Sup. Ronen,

I'm a resident of San Francisco writing to strongly support prohibiting gas in new construction. The methane leaks, air pollution, and explosion dangers of natural gas are no longer necessary for the functioning of our homes and businesses. San Francisco can lead the state and the country in building a better future.

In addition to recommending the ordinance, I would also like to ask the Commission to recommend the changes to the ordinance as laid out by Earthjustice, the Sierra Club, the San Francisco Climate Emergency Coalition, and other local groups in their letter to the Commission and Board.

It is important to me that we:

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an exemption.

6. Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022. Existing restaurants are not helped by giving builders a pass on making future commercial kitchens all-electric.

Thank you for taking up this important issue and considering the health and safety of our residents and climate.

Cate Levey
leveycat@gmail.com
1040 Hampshire St
San Francisco , California 94110

From:	SF Climate Emergency Coalition
To:	Peskin, Aaron (BOS); Safai, Ahsha (BOS); Preston, Dean (BOS); MandelmanStaff, [BOS]; Major, Erica (BOS)
Cc:	Raphael, Deborah (ENV); Board of Supervisors, (BOS); Bintliff, Jacob (BOS); Hepner, Lee (BOS); Smeallie, Kyle (BOS); Sandoval, Suhagey (BOS); Comerford, Cyndy (ENV)
Subject:	Technical Feasibility of All-Electric Multi-Unit High Rise Buildings (Re: BoS File 200701)
Date:	Wednesday, September 23, 2020 11:47:08 AM
Attachments:	Heat pump Installation drawing.pdf 14_Engineering-Bulletin_HPWH-Piping-Arrangements.pdf

To: Members of the Land Use Committee, Supervisor Mandelman, and the Department of the Environment

At the September 21 Land Use hearing on the all-electric new construction legislation, Supervisor Safai asked if multi-unit high-rise could be supported. The answer, as stated by both Supervisor Mandelman and Director Raphael, is an unequivocal “YES”

However, there is a significant difference in the type of systems used for high-rises from those used in 2 to 4 story buildings. There are many off-the shelf systems designed for residential units in a 2-4 story building, as this is a common residential building. However, for large high-rises these standard components are not suitable, and so a custom designed system is required. This is also the case for a conventional gas fired system in high-rises. The water distribution system design in high-rises is complex no matter how the water is heated.

Although at the moment fewer companies support this heat pump market segment, Colmac is a leader in the field (https://colmacwaterheat.com/). Their modular units can be combined in many ways to support a building of any size, while occupying a relatively small footprint in the building.

A local example is Casa Adelante (2060 Folsom St, San Francisco, CCDC & MEDA) has just started leasing, providing affordable housing and transition age youth housing with ground floor retail space on the first floor. It has 127 units in a 9 story 100% electric design building, which uses Colmac air source heat pumps for hot water.

Colmac has an engineering bulletin (attached) with guidelines for installation in much taller buildings. An example cited in support of the Berkeley ordinance is the 5th & Lenora project in Seattle. This all-electric 44-story. 450+ units building (https://cao-94612.s3.amazonaws.com/documents/Scott-Shell-Oakland-Berkeley-All-electric-multi-family-buildings-6-13-19.pdf, pp20, 22) is in the final pre construction phase.

Attached are 2 pdfs with relevant information from Colmac, as well as a link to an overview of building electrification:

- “HeatPump Installation Drawing”, a set of three Colmac drawings showing how several modules can be combined in a relatively small floor area.
- A Colmac engineering bulletin showing various installation schematics. In particular, Figure 8 (p.13) shows a recommended configuration for a 30-story residential high-rise

Additionally, there is “A Zero Emissions All-Electric Multifamily Construction Guide” from

Redwood Energy, a world leader in affordable all -electric construction working with the California Building Decarbonization Coalition. This is an overview of all electric construction, with information on large residential projects. This file is too large for e-mail but can be found at *http://www.buildingdecarb.org/store/p7/ZEB-Multifamily-Guide.html*

Should you want more technical details on the heat pump system capabilities, you can contact Erik Parsley at Colmac (erik.parsley@colmacwaterheat.com, 800-926-5622), or any of the other Colmac engineers.

Of course, we would also be happy to discuss this further. Feel free to reach out if you have further questions

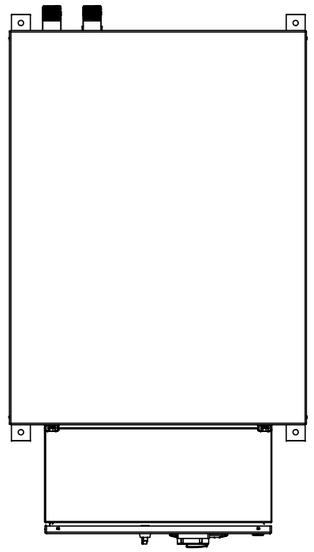
Best,

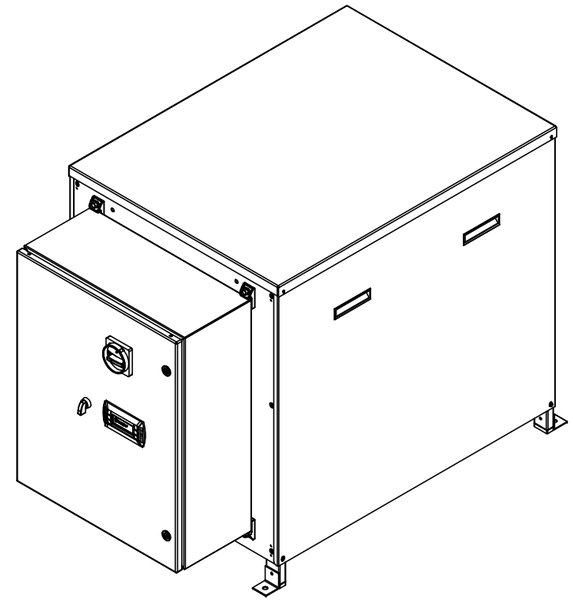
SF Climate Emergency Coalition

Website | Twitter

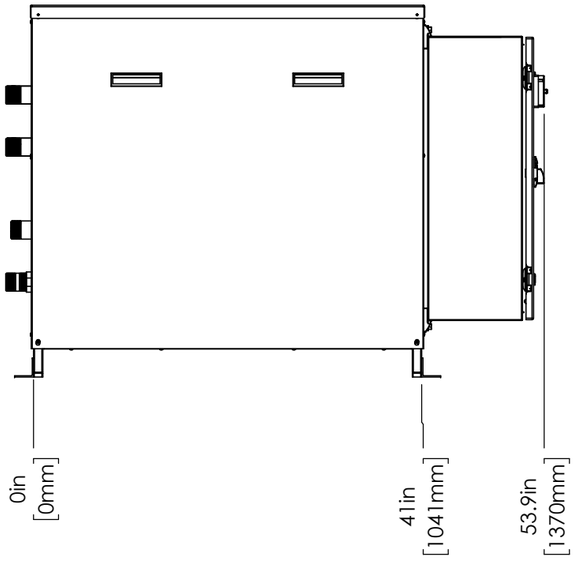
Unit Specifications:

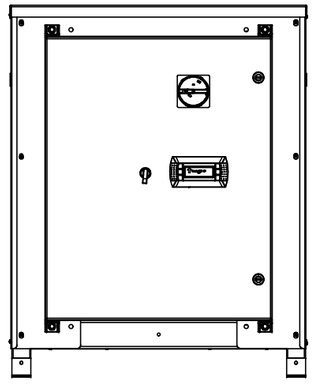
Compressor:	(1) Scroll, Copeland or Equivalent
Condensers:	(1) Brazed Plate
Evaporators:	(1) Brazed Plate
Potable Water Pump:	(1) Standard, 150 Max Working Pressure
Source Water Pump:	Provided by Others; 165 PSI Max Working Pressure
Maximum Source Flow Rate:	150 GPM
Control:	Microprocessor (PLC)
Frame:	304 SST
Refrigerant:	134a



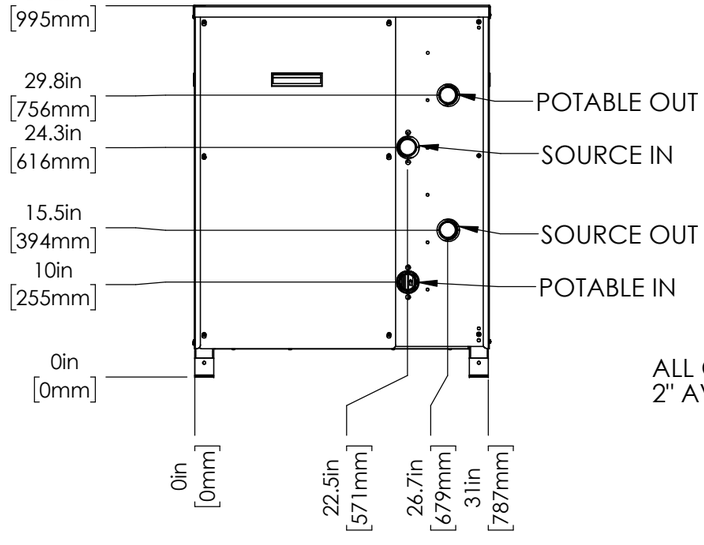


RIGHT SIDE VIEW





REAR VIEW



ALL CONNECTIONS ARE 1.5" MNPT.
2" AVAILABLE BY REQUEST.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±0.03
THREE PLACE DECIMAL ±0.031

DRAWN BY KLR DATE 5/12/2017
ENGINEER - DATE -
SOLIDWORKS AUTOCAD
DO NOT SCALE DRAWING

REV. No. | SHT. No. | **REV STATUS OF SHEET**

COLMAC INDUSTRIES
401 N. Lincoln, Colville, Washington 99114
(509)684-4505

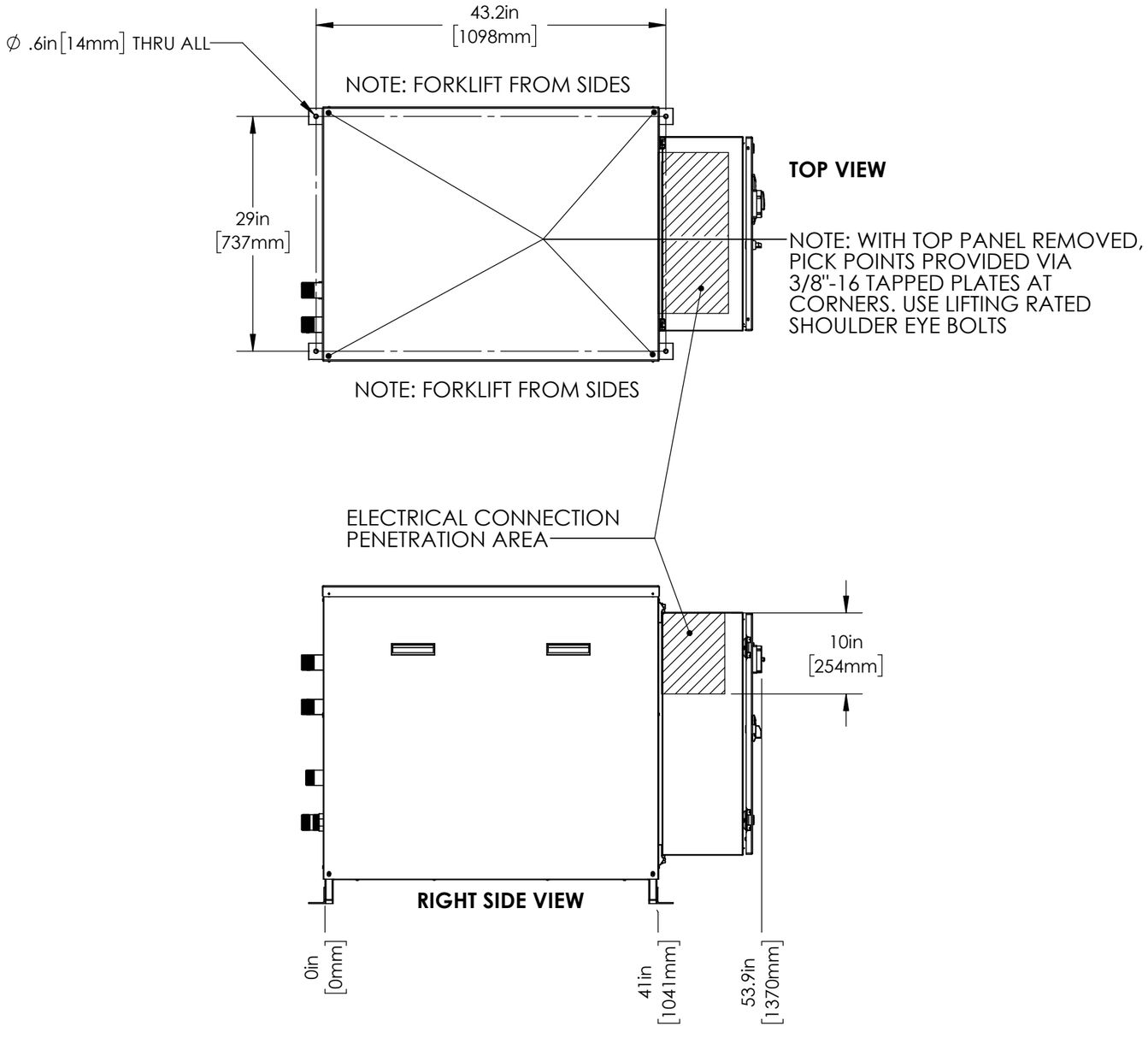
TITLE:
GENERAL SUBMITTAL
CxW-10 THRU CxW-30

SIZE B | DWG. NO. 1010CXW-0001 | REV

SCALE: 1:16 | UNIT WT. | SHEET 1 OF 3

2/12/2019
1010CXW-0001

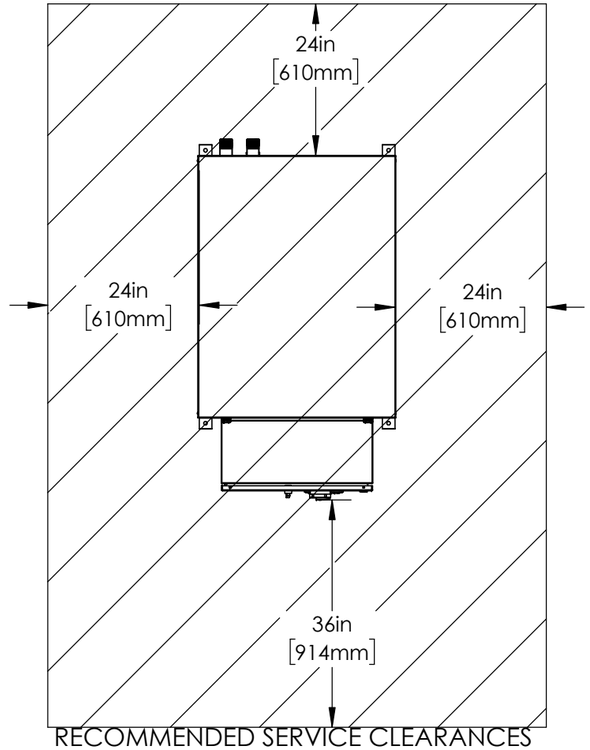
UNIT MOUNTING HOLE LOCATIONS TO FLOOR



TOP VIEW

NOTE: WITH TOP PANEL REMOVED, PICK POINTS PROVIDED VIA 3/8"-16 TAPPED PLATES AT CORNERS. USE LIFTING RATED SHOULDER EYE BOLTS

RIGHT SIDE VIEW



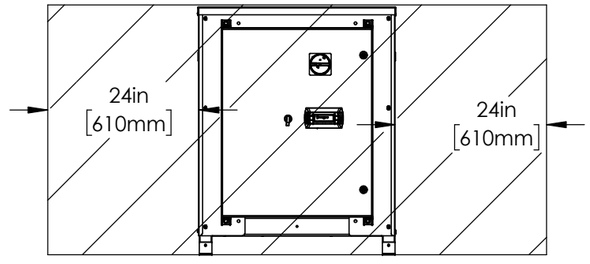
RECOMMENDED SERVICE CLEARANCES

TOP VIEW

NOTE: THE ELECTRICAL BOX MAY BE REMOTELY MOUNTED TO AVOID OBSTRUCTION. CONSULT FACTORY FOR DETAILS.

FRONT VIEW

RECOMMENDED SERVICE CLEARANCES



REV. No.	REV STATUS OF SHEET
SHT. No.	

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TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±0.03
THREE PLACE DECIMAL ±0.031

DRAWN BY	DATE
KLR	5/12/2017
ENGINEER	DATE
-	-

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COLMAC INDUSTRIES
401 N. Lincoln, Colville, Washington 99114
(509)684-4505

TITLE:
GENERAL SUBMITTAL
CxW-10 THRU CxW-30

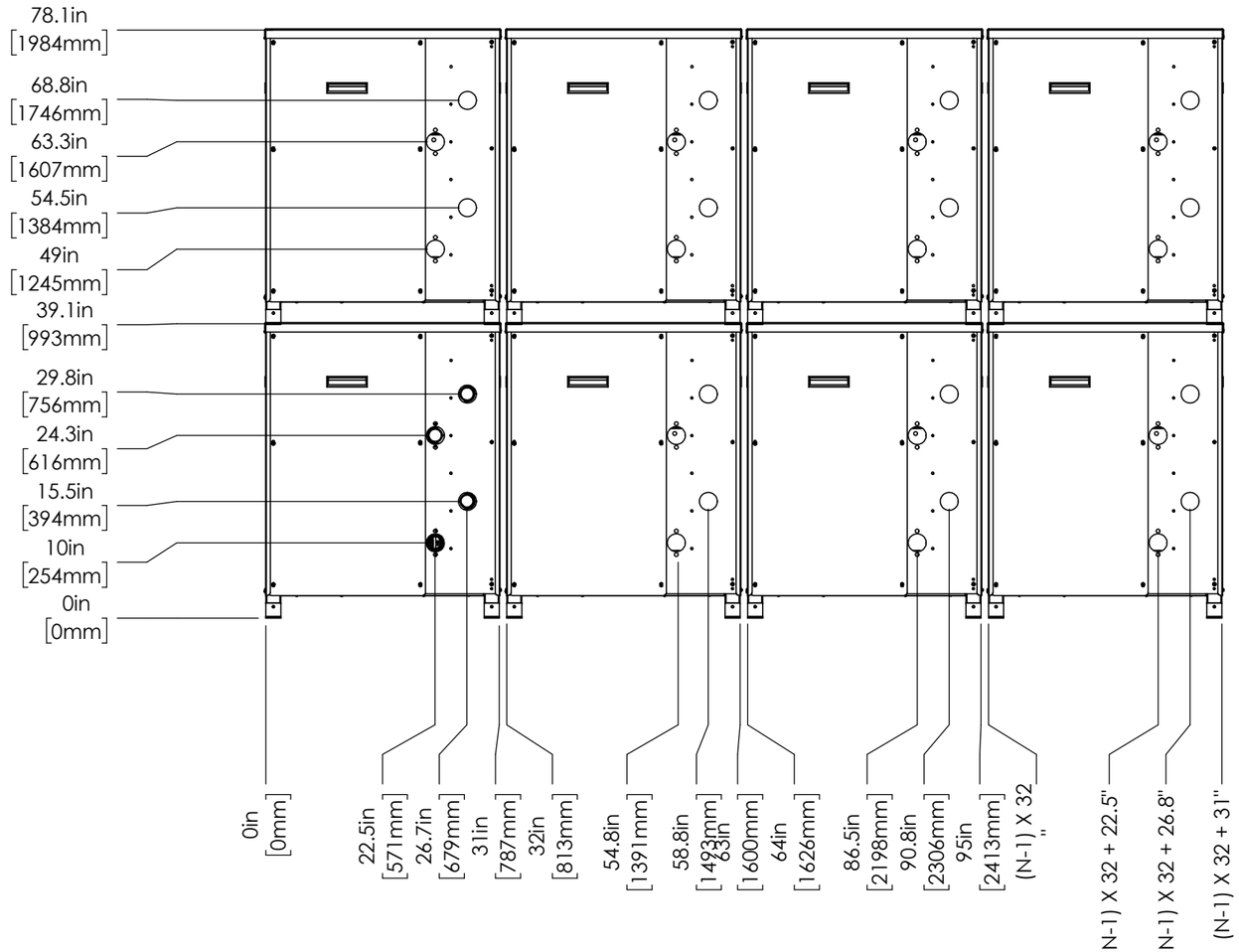
SIZE	DWG. NO.	REV
B	1010CXW-0001	

SCALE: 1:16 UNIT WT. SHEET 2 OF 3

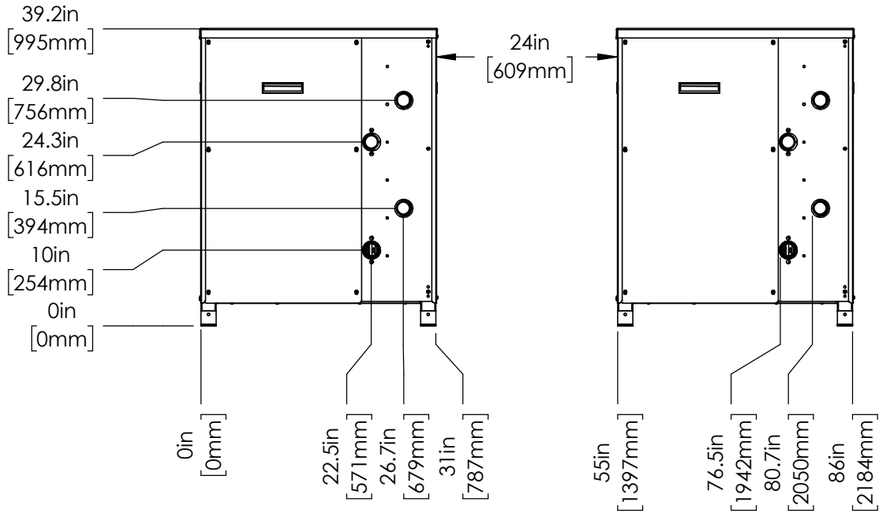
2/12/2019 1010CXW-0001

NOTE: UNITS MAY BE STACKED UP TO TWO HIGH (STACKING IS NOT SEISMICALLY RATED)
UNITS MAY ALSO BE INSTALLED SIDE BY SIDE WITH 1" GAP SO LONG AS PROVISION IS MADE FOR SERVICING (FOR EXAMPLE, BY PULLING UNITS FORWARD, OR BY MOVING UNITS TO ONE SIDE); OTHERWISE, A MINIMUM OF 24" IS RECOMMENDED BETWEEN UNITS.

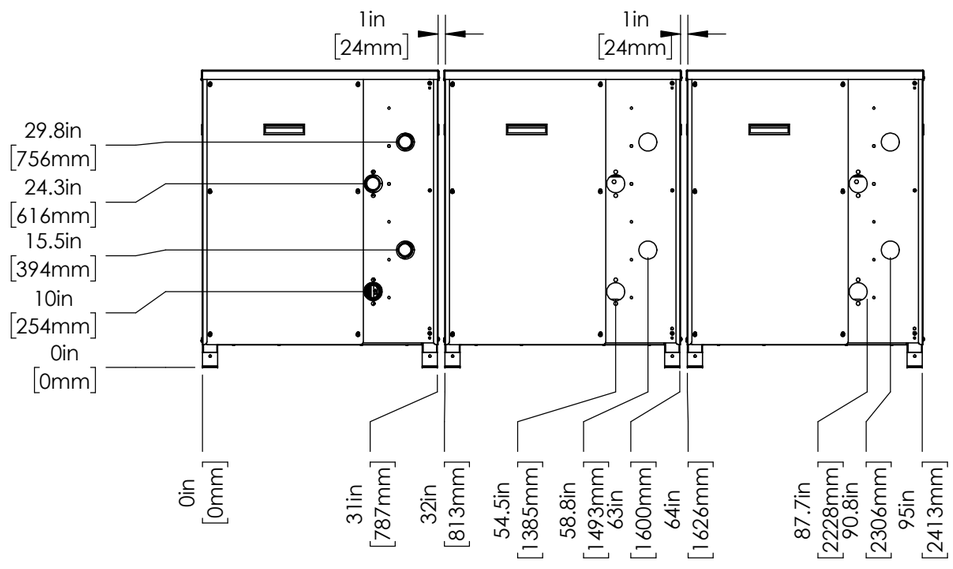
EXAMPLE CONFIGURATION: 2 X N
SERVICE CLEARANCE PROVIDED BY MOVING STACKED UNIT PAIR FORWARD



EXAMPLE CONFIGURATION: 1 X 2 WITH SERVICE CLEARANCE



EXAMPLE CONFIGURATION: 1 X 3



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SHT. No.	

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SOLIDWORKS | AUTOCAD

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SCALE: 1:16 | UNIT WT. | SHEET 3 OF 3

2/12/2019
1010CXW-0001

COLMAC WATERHEAT

Engineering Bulletin

940126-0003
Rev B

Piping Arrangements for
Heat Pump Water Heating

Contents

1. **INTRODUCTION**

1.1. Sanitary (Domestic) hot water can be effectively and efficiently heated using Colmac Heat Pump Water Heaters (HPWH). Because they use low grade (low temperature) heat as the energy source, Colmac Heat Pump Water Heaters can heat sanitary water and simultaneously cool air (or water) with as little as 1/10th the energy input of conventional boilers and chillers. Correctly piping the Colmac Heat Pump Water Heater to the building hot water system is critical to proper and successful operation. Incorrect piping and/or storage tank selection can result in inadequate hot water temperatures and/or heating capacity of the system - even though the heat pumps may be sized with more than enough heating capacity!

2. **WATER PIPING**

2.1. General: For proper heat pump operation it is important to plumb the water piping and storage tanks as indicated in the appropriate piping diagrams. Several common piping diagrams are included at the end of this section

2.1.1. All piping diagrams show nonvented pressurized systems. Vented nonpressurized systems are not recommended.

2.1.2. System piping should be plumbed and storage tanks installed in accordance with all local and national codes that apply.

2.1.3. A Pressure Temperature (P-T) type relief valve is required on all nonvented pressurized tanks, as shown in the piping diagrams.

2.2. Insulation: It is highly recommended that all hot water piping and storage tanks be insulated for energy efficiency.

2.2.1. Outdoor applications: Fiberglass with aluminum sheathing is preferred for piping and tanks (also sprayed foam for tanks).

2.2.2. Indoor applications: Fiberglass with paper sheathing is preferred for piping and tanks (also sprayed foam for tanks). Closed cell foam is acceptable for piping and tanks, where permitted.

2.3. Pipe Sizing: Colmac heat pump water heaters are equipped with internal hot water circulating pumps. These internal circulating pumps are capable of maintaining the minimum required water flowrate through the heat pump with external pressure drops up to 4.1 ft H2O (12 kPa) for 50 Hz models and up to 7 ft H2O (21 kPa) for 60 Hz models. Pressure drop through the hot water piping connecting the heat pump(s) to storage tanks must be carefully calculated and limited to these maximum values. If higher pressure drops are unavoidable then a pressure booster circulating pump must be installed in the hot water piping to compensate and maintain sufficient water flow through the heat pump(s).

2.4. Existing Water Storage Tanks: The use of existing resistance heat water tanks is permitted when the tank volume is suitable for the job application.

2.4.1. WARNING. The use of existing gas water heaters and boiler as storage tanks is not recommended due to high standby losses.

2.4.2. The use of existing water storage tanks is permitted only if measures are taken to remove all accumulated scale deposits in the tank prior to starting heat pump system.

2.4.3. WARNING. Using existing water tanks without proper cleaning can result in fouling of the internal heat pump water piping and may cause damage to the water circulating pump.

2.5. Booster Pump:

2.5.1. In piping systems where the heat pump is located far away from the storage tanks, it may be necessary to install a booster pump to maintain the minimum required flow rate. See the pump manufacturers design data for the required flow rate and pressure. Reference section 7.3 above.

2.6. Net Positive Suction Head (NPSH):

2.6.1. This term is defined as the water pressure required at the inlet of the pump to cause water to flow (and prevent cavitation). NPSH can be calculated as follows:

- NPSH = Barometric Pressure + Static Pressure on Suction - Friction losses in Suction Piping - Vapor Pressure of Water

2.6.2. Minimum NPSH required for the circulating pump to operate without cavitating is 9.5 psi (65 kPa).

2.6.3. Normally with non-vented pressurized hot water systems, NPSH is well above the 9.5 psi required by the circulating pump. NPSH becomes critical when the hot water system is vented and non-pressurized. For a vented system, it is important to locate the heat pump below the storage tank. This will: a) Keep the NPSH above the minimum required 9.5 psi, and b) prevent a loss of prime in the pump (the circulating pump is not self-priming).

3. HEAT PUMP WATER HEATER PIPING

3.1. General

3.1.1. For most sanitary water heating applications, hot water usage varies from hour to hour and follows a “load profile” over the course of the day. Normally in occupied buildings (hotels, apartments, hospitals, restaurants, etc), peaks in hot water usage occur in the morning hours and again in the evening.

3.1.2. Heating and storing hot water during off-peak periods allows the heat pump water heater size (and first cost) to be reduced.

3.1.3. Control of the heat pump water heat.er(s) is by a simple aquastat with the sensor located as shown in the drawings below. The sensor is located below the centerline of the cold tank.

3.1.4. Storage efficiency of the tanks is maximized when they are piped in series as shown in the diagrams below (See Colmac Document 930091-0053)

3.1.5. It is important to insure and confirm that there is an adequate source of heat for the heat pump year around, especially during winter months when air temperatures and air-conditioning loads are lowest. In the event that sufficient waste heat or air-conditioning loads are not available during winter months, backup or auxiliary water heating must be considered.

3.2. Colmac HPA Air-Source HPWH

3.2.1. Colmac HPA air-source heat pump water heaters can be used effectively when the building has a central hot water system but no central air-conditioning system, or limited access to the central air-conditioning system.

3.2.2. Piping connecting HPA heat pumps to storage tanks is as shown in the diagrams below. Only hot water piping is needed with air-source heat pump water heaters.

3.2.3. Strainers should be added to the water inlet to filter out sediment before it reaches the HPA.

3.3. Colmac HPW Water-Source HPWH

3.3.1. Colmac HPW water-source heat pump water heaters can be used effectively when the building has both central water heating and central air-conditioning.

3.3.2. Piping connecting HPW heat pumps to storage tanks is identical to HPA heat pumps and is as shown in the diagrams below.

3.3.3. Source water may be taken either from the condenser water loop or from the return chilled water line.

3.3.4. Energy efficiency and COP of the heat pump will be highest when condenser water is used as the heat source. However, care must be taken not to overcool the condenser water during periods of low air-conditioning loads. Overcooling the condenser water loop may result in problems with chiller operation (i.e. on startup).

3.3.5. Colmac HPW heat pump water heaters are provided with source water circulating pumps, so not external pumps are needed.

3.3.6. Source water piping consists of a simple tie-in to and from the chilled water return main, or to and from the condenser water supply main. In either case it is important to confirm that the flowrate in the source water main (return chilled water or condenser water) exceeds the flowrate circulated through the Colmac HPW unit.

3.3.7. Strainers should be added to the Potable and Source water inlets to filter out sediment before it reaches the HPW.

3.4. HPA/HPW Sequence of Operation

3.4.1. The HPA or HPW heat pumps are simply cycled on and off by an aquastat with its sensor mounted in the first of the storage tanks (the “cold tank”). The aquastat sensor should be located below the centerline of the cold tank as shown in the diagrams below.

3.4.2. When multiple HPA or HPW heat pumps are used with a common storage tank(s), a staged aquastat may be used to effectively vary the heating capacity of the system.

4. **RINGMAIN (RECIRCULATING LOOP) PIPING**

4.1. General

4.1.1. Colmac has developed the HRH Heat Recovery Ringmain Heater and the RH Ringmain Heater specifically to manage ringmain flow and heating to maintain 100% safe sanitary water temperature at set point at all times.

4.1.2. The Colmac HRH Heat Recovery Ringmain Heater is a heat pump water heater designed specifically to recover waste heat either from the building air conditioning system (returned chilled water or condenser water), or from a source of warm humid air, while reheating the sanitary water in the ringmain to maintain safe setpoint

temperature. The HRH15W water-source model incorporates both source water and sanitary hot water circulating pumps to simplify installation. The HRH15A air-source model produces cool dehumidified air which can be ducted directly to provide spot cooling.

4.1.3. The Colmac model RH15E Ringmain Heater uses self-regulating electric resistance elements to heat the ringmain loop water to maintain the sanitary water setpoint temperature while providing loop water circulation.

4.1.4. The sanitary hot water pump in both the HRH and RH units is designed to circulate the ringmain water and eliminates the need for a separate ringmain circulating pump.

4.1.5. The HRH and RH units are sized to provide enough make-up heating and sanitary hot water circulation for typical ringmain loops handling 6 to 10 floors, depending on loop configuration, water and ambient temperatures, and thickness of loop pipe insulation.

4.2. HRH Sequence of Operation

4.2.1. The HRH unit controls are self-contained, simple, and automatic. Whenever power is applied to the HRH unit, the hot water circulating pump is powered on and continuously circulates sanitary hot water through the ringmain.

4.2.2. Temperature of the ringmain return hot water entering the HRH is monitored by a temperature sensor mounted internally in the unit. Whenever this temperature falls below an adjustable setpoint temperature (minus differential), the unit compressor and source water circulating pump start and continue to operate until the ringmain return water temperature reaches setpoint, at which point the HRH compressor and source water circulating pump then cycle off. Safe sanitary water temperature in the ringmain is thus maintained at all times.

4.3. HRH Installation

4.3.1. The HRH15W water-source unit has been designed with small footprint dimensions to allow installation in mechanical spaces with limited floor space.

4.3.2. The most convenient location for the HRH15W water-source unit is in the mechanical space close to the building pipe well. This allows the unit to be easily piped to the source water piping (either the return chilled water riser or the condenser water riser). The unit is designed for installation against a wall or in a corner of the mechanical room with easy access to service the electrical and mechanical components.

4.3.3. The HRH15A air-source unit has been designed with low profile (vertical) dimensions to allow installation in overhead mechanical spaces and false ceilings to conserve floor space. The centrifugal fan allows the cooled air to be ducted to provide spot cooling or augmentation to the building air conditioning system.

4.4. RH Sequence of Operation

4.4.1. The model RH15E controls are self-contained, simple, and automatic. Whenever power is applied to the RH unit, the hot water circulating pump is powered on and continuously circulates sanitary hot water through the ringmain.

4.4.2. Temperature of the ringmain return hot water entering the RH unit is monitored by a temperature sensor mounted internally in the unit. Whenever this temperature falls below an adjustable setpoint temperature (minus differential), the unit electric resistance heating elements cycle on and continue to operate until the ringmain return water temperature reaches setpoint, at which point the RH elements cycle off. Safe sanitary water temperature in the ringmain is thus maintained at all times.

4.5. RH Installation

4.5.1. The RH15E unit has been designed with small footprint dimensions to allow installation in mechanical spaces with limited floor space.

4.5.2. The most convenient location for the RH15E unit is in the mechanical space close to the building pipe well. This allows the unit to be easily piped to the ringmain piping. The unit is designed for installation against a wall or in a corner of the mechanical room with easy access to service the electrical and mechanical components.

5. **HOT WATER SUPPLY RISER PIPING**

5.1. General

5.1.1. In tall buildings with multiple ringmain loops (i.e. more than 8-10 stories) a hot water supply riser is needed to supply the multiple ringmains. Typically the highest ringmain is supplied by a booster pump to provide adequate water pressure to the fixtures on the top floor. Each of the lower ringmains is then supplied with hot water via the hot water supply riser pipe through a PRV (Pressure Reducing Valve) set to match the cold water pressure (also set through a PRV for the same floors supplied by the hot water ringmain).

5.1.2. NOTE: Colmac recommends that both cold water storage as well as sanitary hot equipment and storage be located at the top of each zone in the building. This is referred to as “top feed”. This arrangement insures that cold water and sanitary water pressures are easily and precisely balanced for each floor.

5.1.3. Just as each ringmain loop requires makeup heating to maintain safe water temperature, the hot water supply riser requires makeup heating and recirculating flow. Since the hot water supply riser is separated from the ringmain loops by PRVs it must be piped with its own Colmac HRH or RH unit and a return riser pipe. Recommended piping arrangement is shown below.

6. **PIPING DIAGRAMS**

6.1. Ringmain loop flow must be prevented from circulating directly through the hot water storage tanks used to store the hot water for the fixtures. Each ringmain loop as well as the hot water supply riser must be circulated and heated separately by its own Colmac HRH or RH unit (described above). This proprietary Colmac method of piping storage tank heat pumps and ringmain heating units separately results in a sanitary hot water system having the following operating characteristics and benefits:

- Lowest first cost,
- Lowest operating cost,
- Lowest life cycle cost,
- 100% health and safety for sanitary hot water,
- Optimized thermal management of hot water ringmains and supply risers,
- Optimized ratio of hot water storage volume to heat pump heating capacity,
- Smallest water heating carbon footprint (highest Carbon Reduction Coefficient – CRC).

Tanks in series with HRH water heating for recirculation loop line losses.

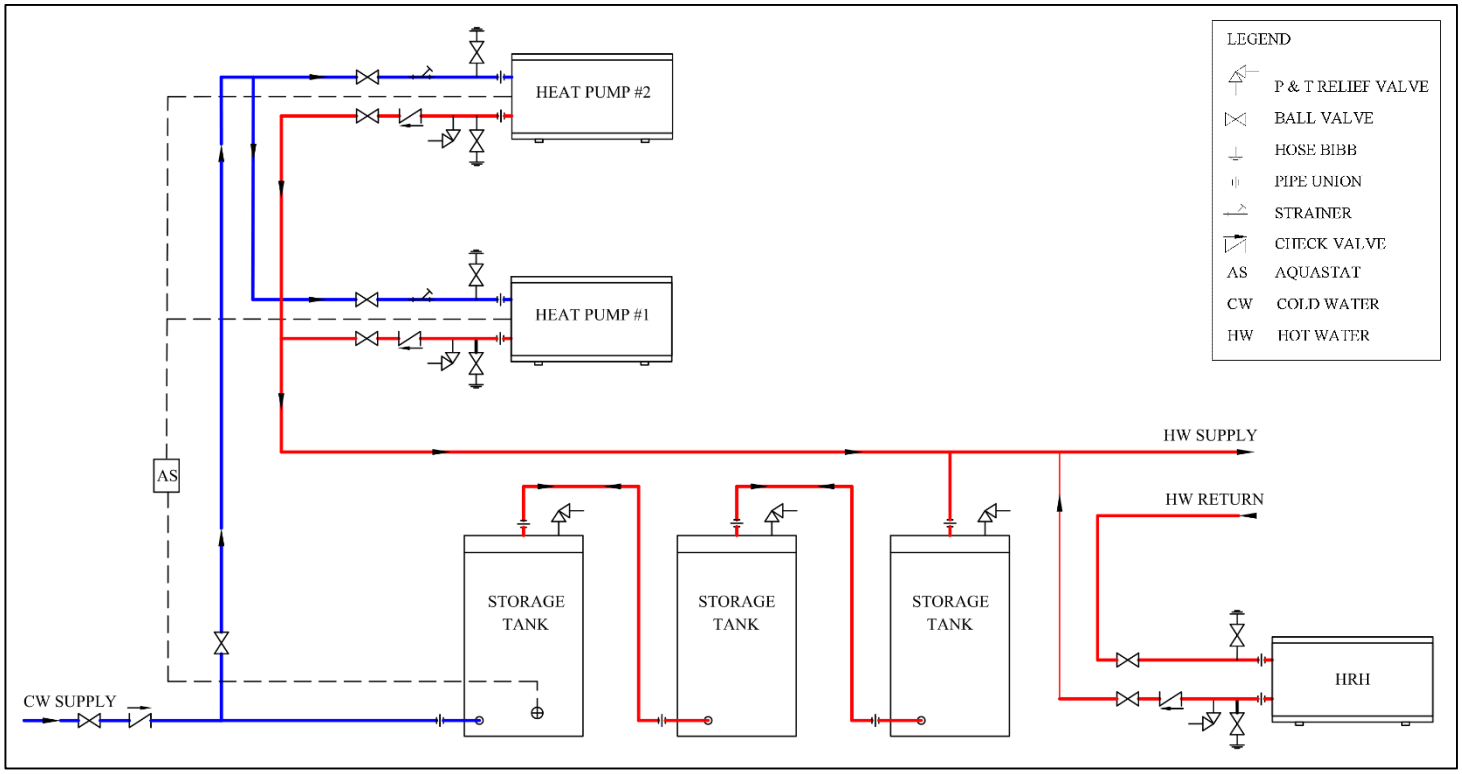

Figure 1

Tanks in series with electric resistance water heating for recirculation loop line losses.

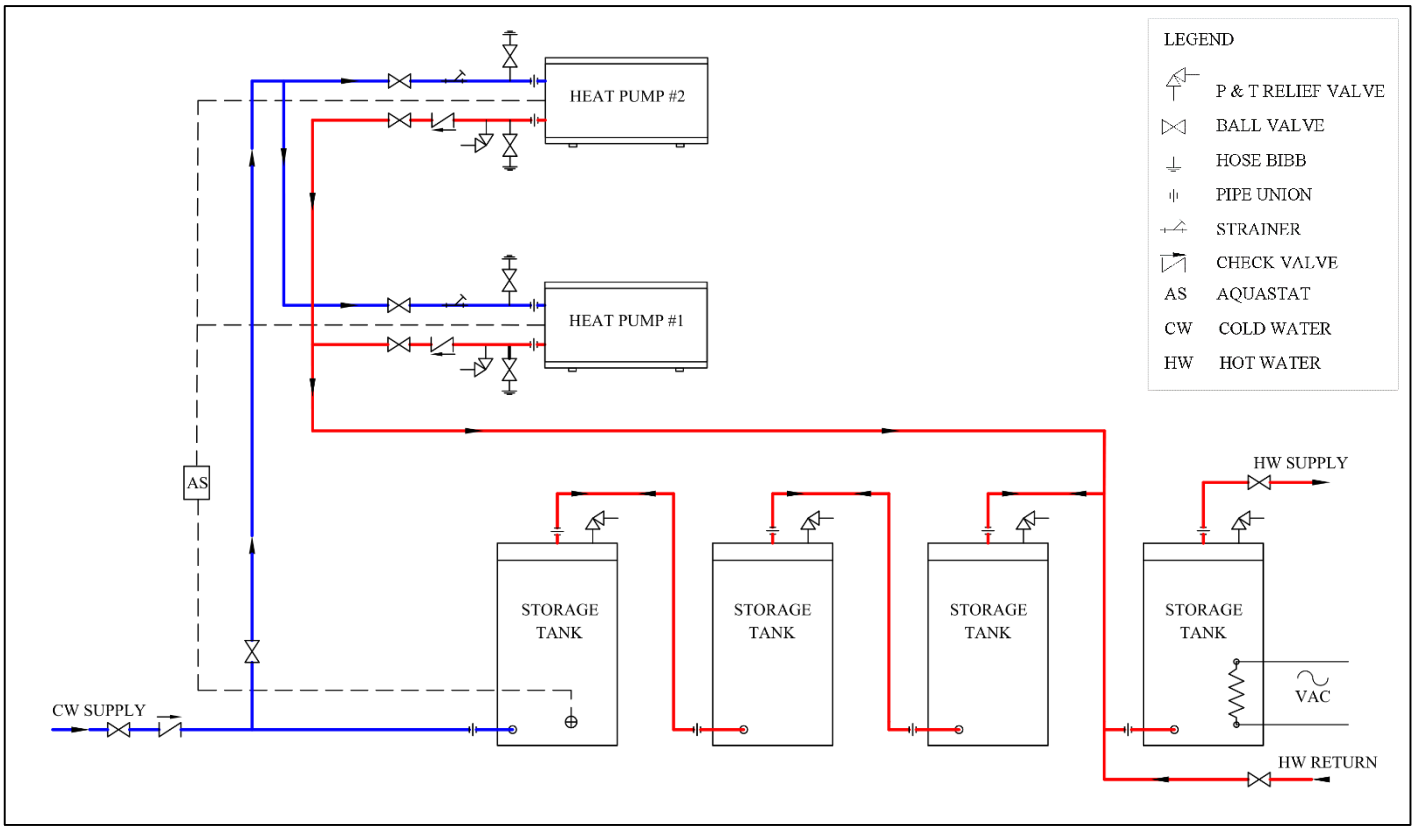

Figure 2

Storage tanks in series, dual aquastat, coldwater storage tank, heated building return

Aquastat setpoints
Start Setpoint: 80°F (Start call for heat at 80°F)
Stop Setpoint: 110°F (End call for heat at 110°F)

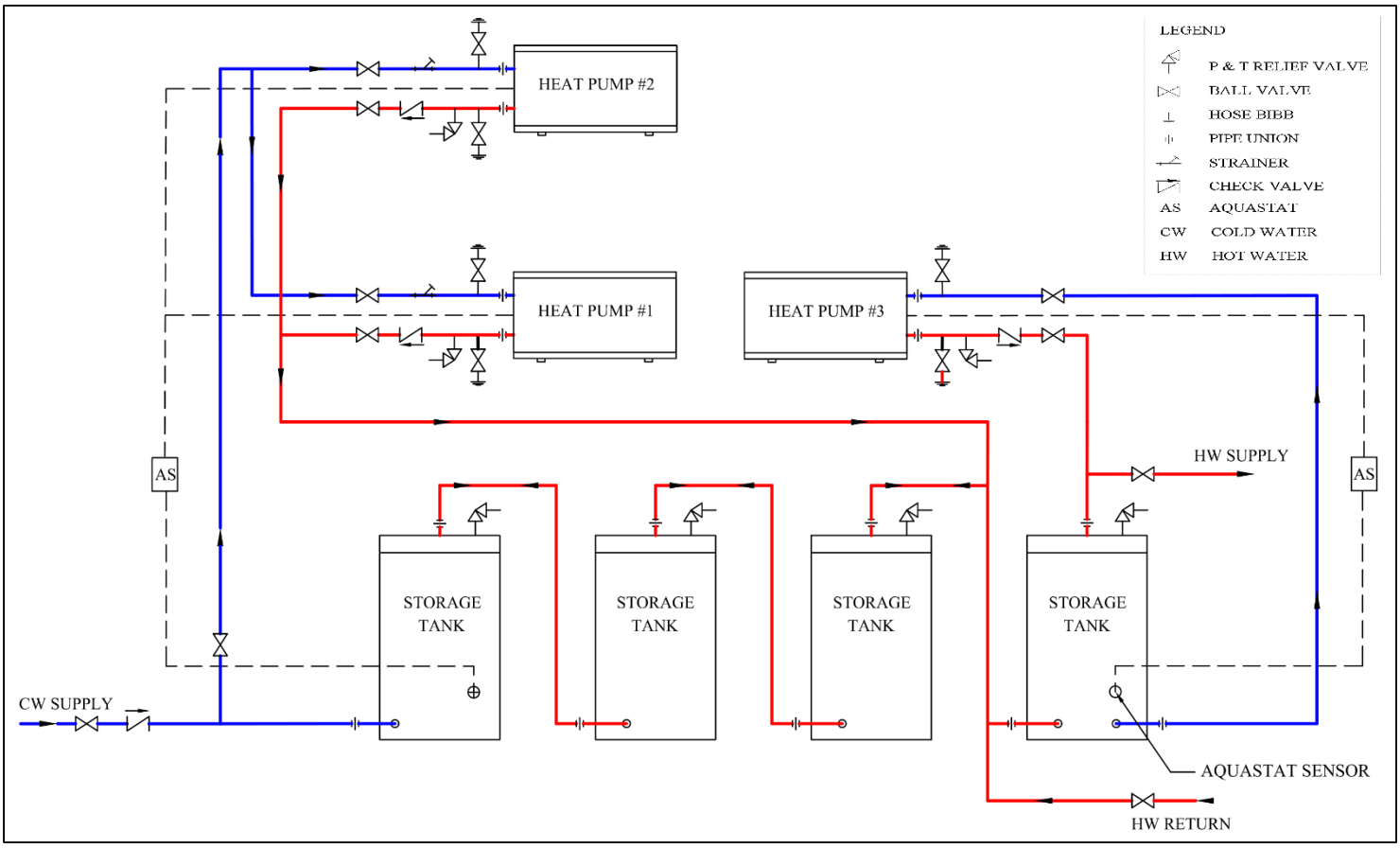

Figure 3

Storage tanks in series, dual aquastat, heated building return

Aquastat setpoints
Start Setpoint: 80°F (Start call for heat at 80°F)
Stop Setpoint: 110°F (End call for heat at 110°F)

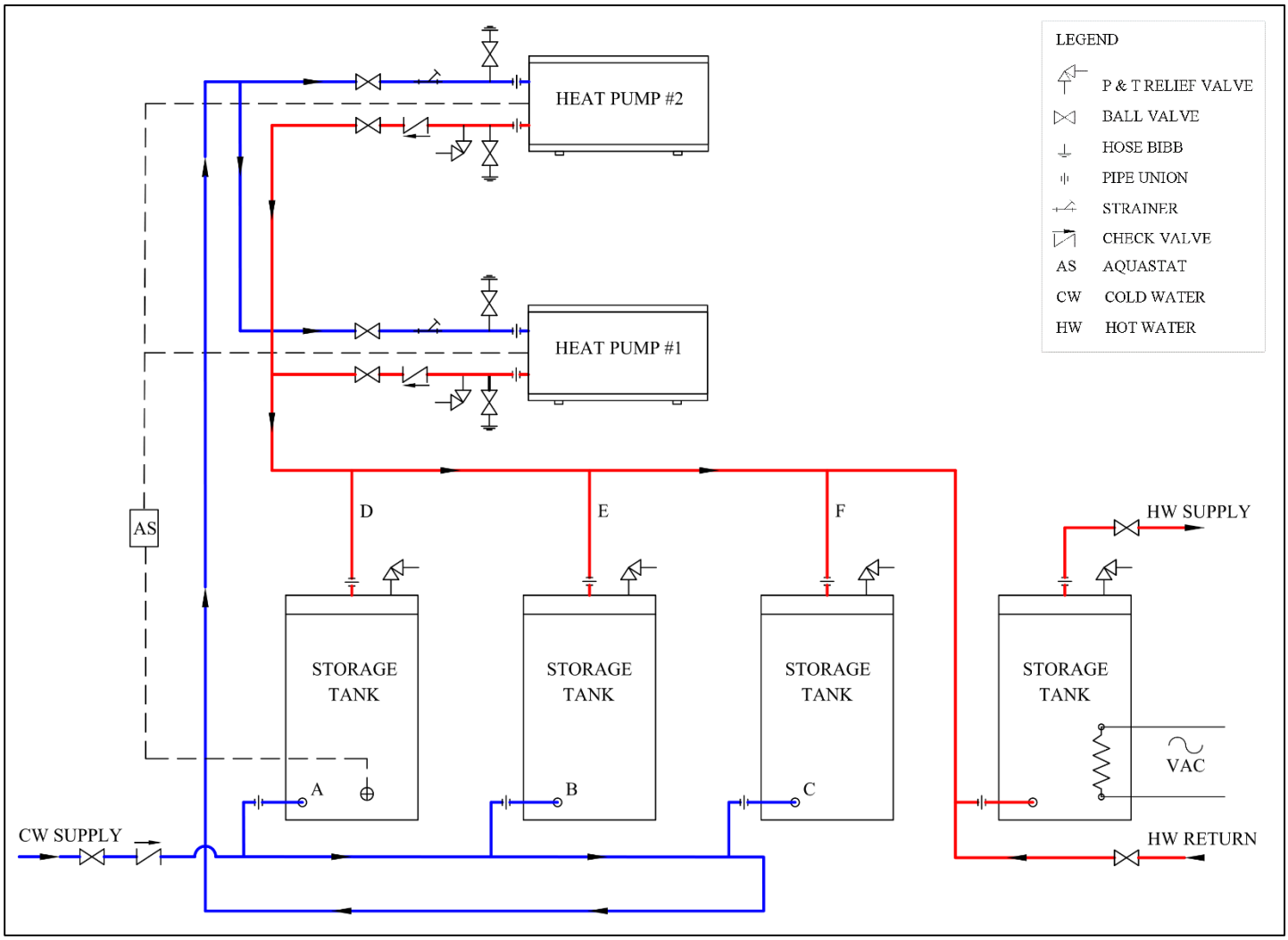

Figure 4

1.1. POOR

1.1.1.

Storage tanks in series, single aquastat, poor hot water return location

Aquastat setpoint and differential:
Setpoint: 110°F (End call for heat at 110°F)
Differential: 30°F (Start call for heat at 80°F)

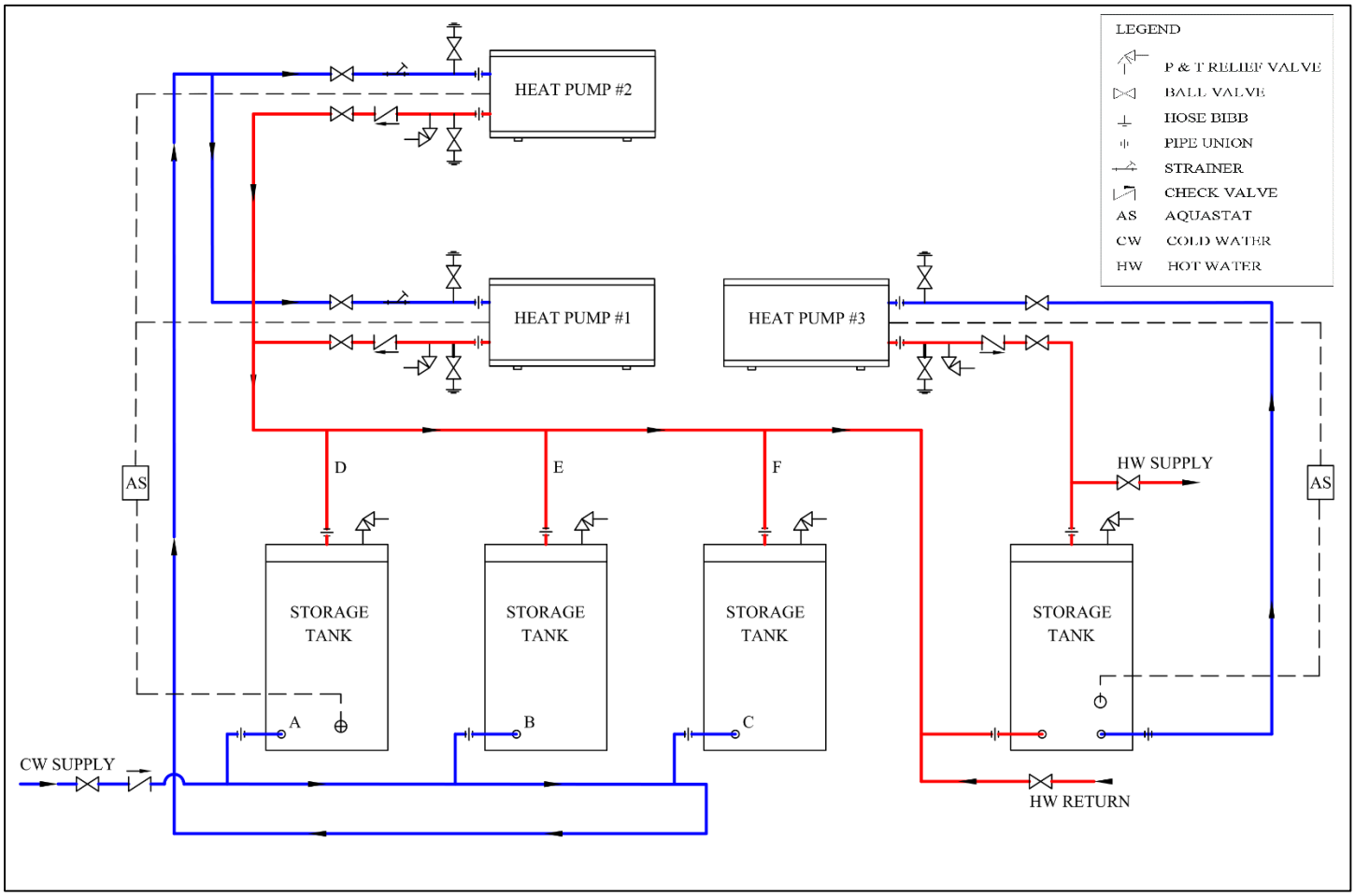

Figure 5

Storage tanks in series, poorly located single aquastat, bad setpoints, heated building return

Aquastat setpoint and differential:
Setpoint: 140°F (End call for heat at 140°F)
Differential: 5°F - 10°F (Start call for heat at 135°F - 130°F)

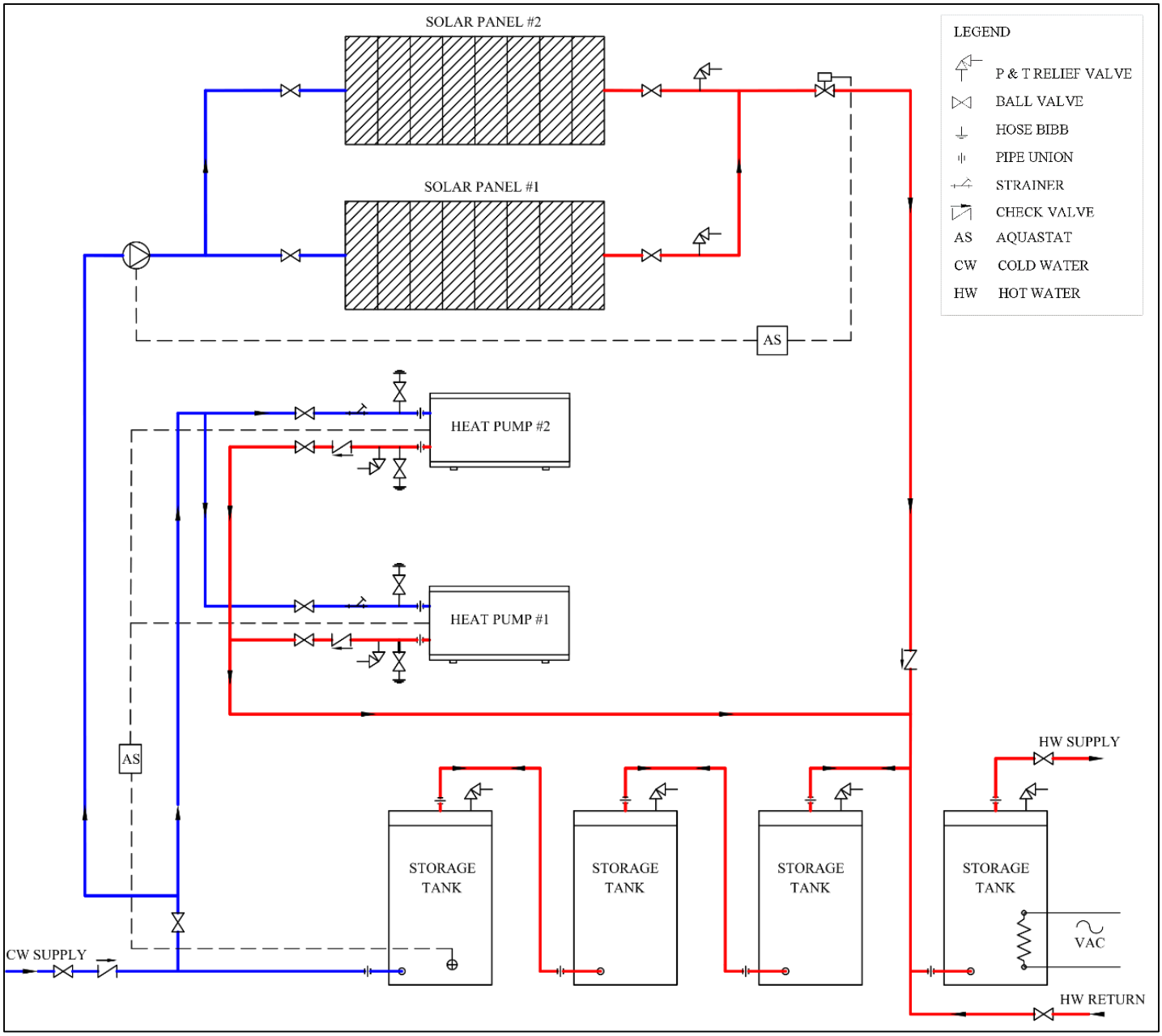

Figure 6

Storage tanks in parallel (reverse return), poorly located single aquastat with bad setpoints, heated building return

Aquastat setpoint and differential:
Setpoint: 140°F (End call for heat at 140°F)
Differential: 5°F - 10°F (Start call for heat at 135°F - 130°F)

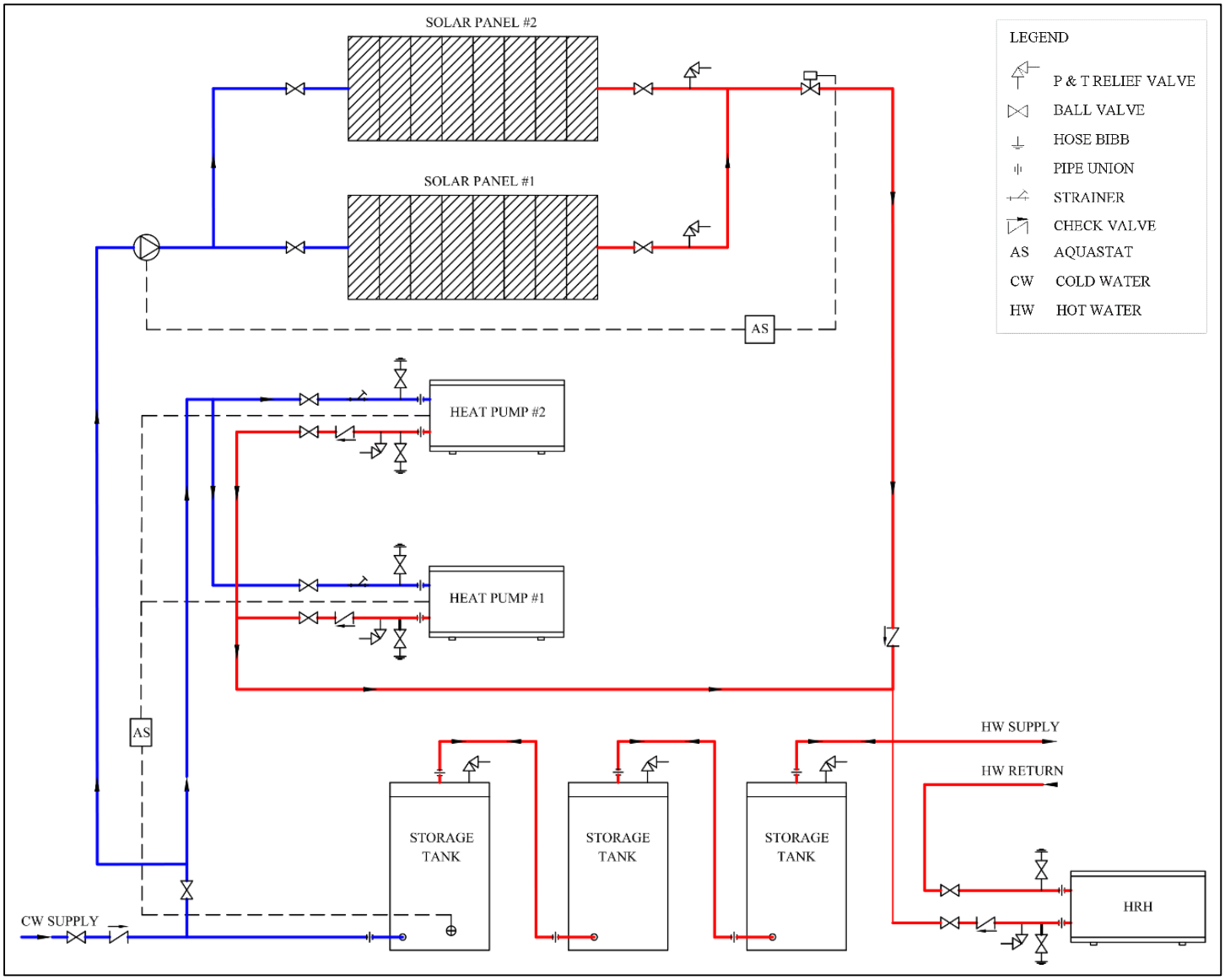

Figure 7

Multi-zone tall building with heat pump water heating for recirculation loop line losses.

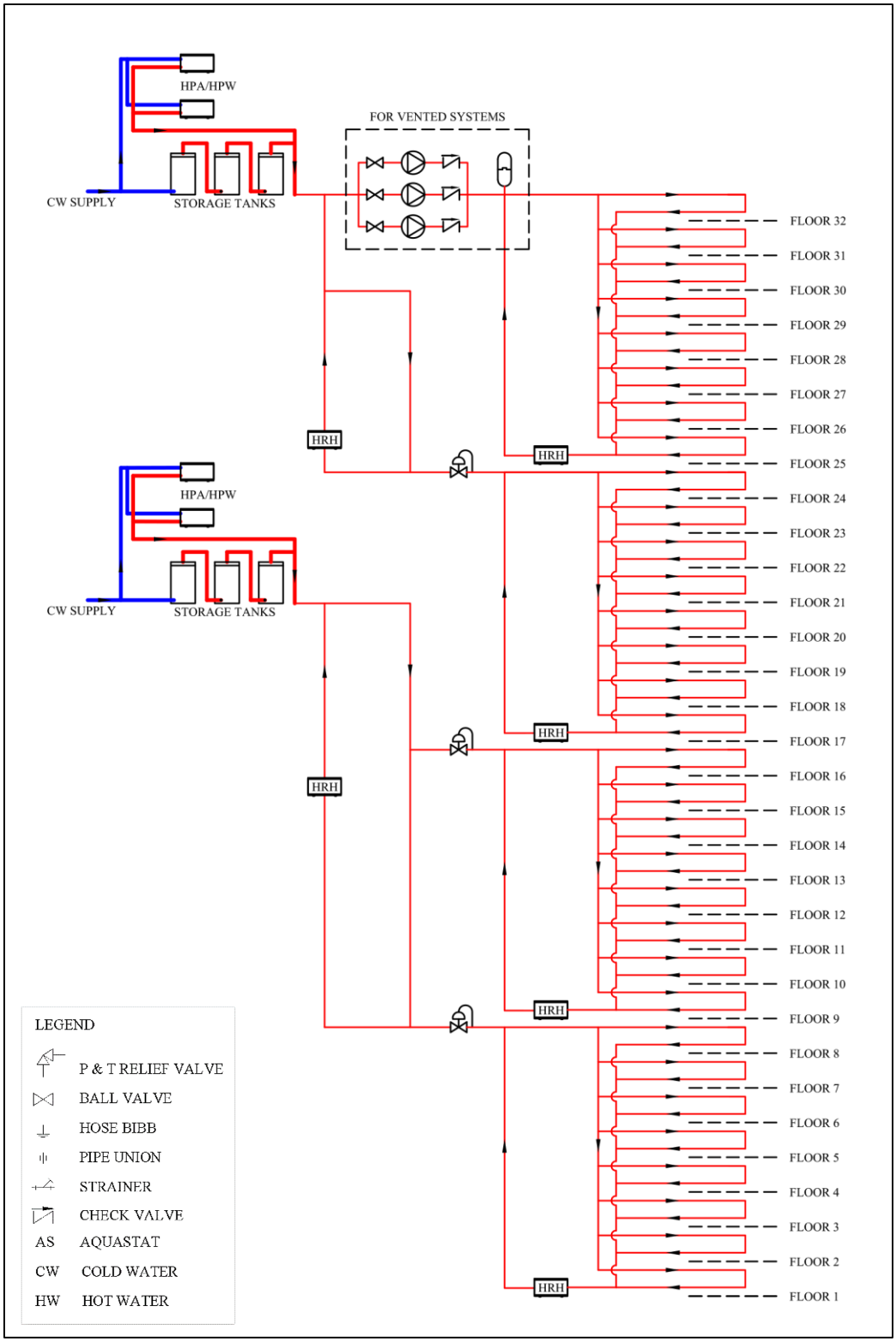

Figure 8

Colmac reserves the right to change product design and specifications without notice.

For more information on Colmac products call us at 1-800-926-5622 or visit us online at:

WWW.COLMACWATERHEAT.COM