Building Decarbonization
Electrifying San Francisco’s Municipal Buildings
San Francisco’s Emission Sources Today

- Transportation: 46%
- Private Sector Natural Gas: 35%
- Municipal Natural Gas: 3%
- Private Sector Electricity: 8%
- Municipal Electricity: 0%
- Agriculture & Wastewater: 2%
- Landfilled Organics: 6%
- Other <1%

Buildings: 44%
Emission Sources - San Francisco Municipal Buildings

- **Natural Gas**: 93.7%
- **District Steam**: 6.3%
- **Electricity**: 0%

Chart Title
Net Zero Emissions Commitments

New Construction by 2030

All Buildings by 2050
Declaring a Climate Emergency in San Francisco

Image: Mothers Out Front
Focus 2030: A Pathway to Net Zero Emissions

- Electrification
- Energy Efficiency
- Renewable Electricity
- Residual Emissions

-48%
-23%
-24%
5%
Ordinance: All-Electric Preferred in New Construction

Maceo May Apartments: Swords to Plowshares, Chinatown Community Development Center, Mithun, AEA
Inform: Climate Action Plan | Env Code, Ch 7

CHAPTER 7:
GREEN BUILDING REQUIREMENTS FOR CITY BUILDINGS

SEC. 700. FINDINGS AND PURPOSE.

The Board of Supervisors finds that:

1. Buildings are one of the distinguishing elements of human civilization. Traditional building design and construction practices have significant negative environmental impacts. In the United States, buildings consume 40% of all energy, 75% of all electricity, and generate 30% of all carbon (CO₂) emissions. In San Francisco, buildings consume 50% of all energy, 80% of all electricity, and generate 50% of all carbon emissions. Advanced green buildings can generate their own energy, minimize carbon emissions, produce and process their own water, eliminate waste of buildings and materials, and provide healthy interior environments.

2. The selection of sustainable design features and building materials is consistent with the City’s Preventive Principle Policy. This policy requires that the City consider a full range of alternatives in order to select products and procedures that minimize harm and preserve the protection of public health and natural resources.

3. The United States Green Building Council (USGBC) is a non-profit organization committed to a prosperous and sustainable future for our nation through cost-effective and energy-saving green buildings. LEED® is an internationally-recognized green building certification system, developed by the USGBC.

4. Green buildings provide financial benefit while producing better and environmental health. Total construction costs for buildings seeking LEED certification fall into the existing range of costs for buildings not seeking LEED certification. Often buildings, on average, result in savings of 20% of total construction costs over the first 20 years of operation.

5. The California Energy Commission has established a goal that all new commercial construction in California will be Zero Net Energy by 2020, and 50% of existing commercial buildings will be retrofitted to Zero Net Energy by 2030.
Participation and Original Schedule

- 13 Departments/Divisions
- Cross-teaching, Invited guests
- Some outside facilitation

- JAN
  Context + prioritization

- FEB
  In-depth exploration

- MAR
  In-depth exploration

- APR
  In-depth exploration

- MAY
  Wrap-up, Linkages

- NOV
  Goal Roadmap complete

Commercial & Residential Workgroup meetings complete
Context: A Range of Possible Futures

- More Voluntary
  - All Carrots, No Sticks
  - Proactive Empowerment
- More Mandatory
  - Slower
    - Reactive (Bare Minimum)
  - Faster
    - Green Police
Context: Pathways to Zero Carbon…

Proactive Empowerment

Current Path

Steady Progress

Difficult Intervention

Emissions from Onsite Fossil Fuels (%)

2020 2030 2040 2050

0 25 50 75 100
Cataloguing and Evaluating Existing Buildings

Small & Contained
Ideal for end-of-life replacement

PARTICULAR

POTENTIALLY CHALLENGING

Everything in between

How to allow for flexibility?

Large & Comprehensive
Excellent opportunity for redesign
Deciding What To Do and When…

**STEP 1:** Department identifies a need

**STEP 2:** Public Works* provides a Project Development MOU (Scope) the “plan for the plan”

**STEP 3:** Public Works* provides ROM $§

**STEP 4a:** Department determines if budget is available CAPEX, OPEX when does it pay for itself?

**STEP 4b.** ORCP negotiates $ available to fit within fixed amount

**STEP 4c:** (may be able to advance before debt is authorized by the Board)

**STEP 5:** Public Works* (sometimes private firm) & Department Design

**STEP 6:** Project Team CONSTRUCTION

**STEP 7:** Department OPERATIONS

* Not only Public Works. Could be any empowered department per Admin Code Chapter 6
Deciding What To Do and When...

**STEP 0:** SFE/ORCP establishes a basis for action
- Have the data ready to inform priorities and decision making.
- Standardize data and allow for adjustment by departments based on their needs.

**STEP 1:** Department identifies a need
- **TYPICAL TRIGGERS:**
  - emergency
  - end-of-life
- **NOTE:** Very few whole HVAC replacement requests come to ORCP - triggers clarifications/questions about project because marginal costs for whole HVAC replacement can be very high.
  - If goal is 3% replacement per year, will require additional money

**STEP 2:** Public Works* provides a Project Development MOU (Scope) the “plan for the plan”
- **<<OPPORTUNITY>>** Ask about possibilities for including electrification in scope
- Software like AutoCase, Archibus (other cities already using - L.A.)

**STEP 3:** Public Works* provides ROM $ opps. for triple bottom line analysis

**STEP 4a:** Department determines if budget is available CAPEX, OPEX when does it pay for itself?
- **OPEX:**
  - Typically spending less on electricity, lower maintenance costs
  - Enterprise departments PUC rates are more $ - how to offset costs?
  - Retrofits = added loads that require panel/T24 upgrades $ (also: avoid investing in buildings that we plan to unload)

**STEP 4b:** ORCP negotiates $ available to fit within fixed amount
- **What is good enough?**
- **What can we do with available funds?**
- **What can we live without?**

**STEP 5:** Public Works* (sometimes private firm) & Department Design
- Need expertise of engineers for innovative solutions that can reduce construction costs

**STEP 6:** Project Team CONSTRUCTION

**STEP 7:** Department OPERATIONS

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* Not only Public Works. Could be any empowered department per Admin Code Chapter 6
5 QUESTIONS
Thank you for making the time to review the following items and provide insights to shape the Zero Emission Building Road Map. We will have a chance to discuss compiled feedback at the next Workgroup meeting, but please document here in as much detail as possible.

1. Priorities Summary
The table below is our first draft attempt to capture the key issues voiced at previous Municipal Existing Building Workgroup meetings. Does this reflect your position/needs? Please suggest revisions or additions.

<table>
<thead>
<tr>
<th>Task Force Input</th>
<th>SFE Interpretation</th>
<th>*Fine Print</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey the portfolio.</td>
<td>We need aggregated and easy access to the many data sources describing buildings and equipment.</td>
<td>Information is available, but it will be an effort to combine datasets, perform Facility Needs Assessments (FNAs), and fill in gaps.</td>
</tr>
<tr>
<td>Just start.</td>
<td>There’s no wrong place to begin: Some buildings are simple, and others may be more complex.</td>
<td>We’ll have to learn as we go, and aim to improve with every iteration.</td>
</tr>
<tr>
<td>Find the highest value.</td>
<td>Fiscal accountability includes addressing deferred maintenance and anticipating future uses for resilience. An integrated planning approach considers technology availability and is not limited to like-for-like replacement of equipment.</td>
<td></td>
</tr>
<tr>
<td>Evolve the funding model.</td>
<td>There will always be financial constraints, and we need to find creative solutions. Total Cost of Ownership or other metric is critical to capture avoided cost and deliver value to the taxpayer.</td>
<td></td>
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<tr>
<td>Prioritize a geographic approach.</td>
<td>We need a decarbonization masterplan. SPUC and PG&amp;E must work together to understand the full impact on individual projects and the grid as a whole.</td>
<td></td>
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RESPONSE:
Empowerment/Education Suggestions

• Policy and Goal language
• Trainings
• Resource libraries and Document templates
• Coordination meetings
• Facilities Maintenance Roundtable
• Advisory Group
• Dedicated citywide fund for retrofits
## Empowerment/Education, Applied

<table>
<thead>
<tr>
<th>ROLE</th>
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<tr>
<td><strong>Leadership</strong></td>
<td>• <strong>Document/Presentation:</strong> Overall requirements, performance expectations, goal alignment</td>
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<tr>
<td><strong>Asset Managers</strong></td>
<td>• <strong>Document:</strong> Specific implementation timelines</td>
</tr>
<tr>
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<td>• <strong>Training/Document:</strong> Modified weighting criteria/guidelines/metrics: carbon, resilience, health (vs first-, lifecycle costs)</td>
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<td>• <strong>Document:</strong> Additional funding sources (grants, incentives)</td>
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<td><strong>Engineers/Designers</strong></td>
<td>• <strong>Training:</strong> Net benefits, equipment specifications, functionality, maintenance requirements</td>
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<td>• <strong>Library:</strong> successful installations, electrical load analyses</td>
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<td>• <strong>Templates:</strong> equipment specifications, Owner’s Project Requirements, (Retro)Cx</td>
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<td><strong>Maintenance Staff</strong></td>
<td>• <strong>Training:</strong> changes to maintenance practices</td>
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<td>• <strong>Library:</strong> pre-vetted drop-in replacements</td>
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<td><strong>Utilities</strong></td>
<td>• <strong>Meetings:</strong> Coordination and agreement in scope and responsibility</td>
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## Findings: Cross-Cutting Themes

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<td>Clarity and Commitment</td>
<td>We must communicate about the future and eliminate barriers to action if we want to be effective.</td>
<td>All building owners and decision makers need to know what will be expected of them, without ambiguity or City-created barriers.</td>
</tr>
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<td>Time and Timing</td>
<td>Anticipation, planning, and resourcing are required.</td>
<td>Missed opportunities must be avoided. Support for action is required, in sync with real estate cycles.</td>
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<td>Value and Values</td>
<td>Electrification brings health, resilience, and decarbonization benefits.</td>
<td>Processes, tools, and metrics must guide decision making to support racial equity and shared benefits for all.</td>
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<td>49 Square Miles</td>
<td>We need a decarbonization masterplan that includes every neighborhood.</td>
<td>Equitable decarbonization, modernizing the grid, attaining seismic benefits, and lowering costs all require a coordinated plan.</td>
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## Findings: Municipal Working Group

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<td>Information is available, but it will be an effort to integrate databases, fill in gaps, and perform assessments. Selection and deployment of a shared platform or common schema will be a significant lift.</td>
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<td>Pursue a geographic approach.</td>
<td>Leverage development patterns and relationships with private sector partners in decarbonization masterplanning.</td>
<td>The City needs to leverage development patterns and relationships with private sector partners. Engagement with utilities early and often will be critical.</td>
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Fuel-Switching Our Existing Building Stock
Thank You!

https://sfenvironment.org/zebtaskforce

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