Agenda

• Impetus for Action

• Energy Efficiency: California looms large

• SF Policy Framework

• Existing Commercial Buildings ordinance: Early results

• Resources
GHG Emissions from San Francisco

- **Transport**: 43%
- **Buildings**: 53%
- **Waste**: 4%
- **Residential**: 21%
- **Commercial**: 26%
- **Municipal**: 6%

Sources: (2010) PG&E, Hetch Hetchy Water and Power, CA. Dept of Transportation, MTC, Muni, BART
Efficiency Investment by City-run Program

- Installed 10,500 efficiency projects
- $3,287 average annual cost savings
- Paid over $37 million in incentives
- Reduced 91,000 tons of annual carbon emissions

Equivalent to:
- Annual savings powering 44,000 homes in San Francisco
Tools for New Construction and Alterations
Commitment in City Facilities First

1999 Municipal Green Building Ordinance

Chapter 7 Environment Code (9/04): LEED Silver
Environmental Review and Building Permit

Standard Timeframe

0

LEED Platinum/ZNE/Passive House/Living Building
0 1 month

Priority Permit Incentive
CA Goals: Zero Net Energy for
• All new residential by 2020
• All new commercial by 2030
• 50% of existing commercial by 2030
State of California Facilities

• All new facilities ZNE by 2025
• By 2018, cut energy purchases 20% for existing buildings
• 3 ZNE pilots launched in 2013
  – New building
  – Major renovation
  – Existing building (no renovation)

Source: Governor Brown
Executive Order B-18-12

tinyurl.com/GovGreenOrder
tinyurl.com/CaGBAction
Zero Net Energy: Difficult But Achievable

Figure 11 – Statewide Technically Feasible Net-EUIs with Solar (TDV$) by Projected 2020 Construction Volume

# San Francisco Building Energy Efficiency Policies

<table>
<thead>
<tr>
<th>Scale</th>
<th>New Construction</th>
<th>Alterations</th>
<th>Existing Homes</th>
<th>Existing Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1% per year</td>
<td>&lt;1% per year</td>
<td>360k homes</td>
<td>~200M sq ft of buildings larger than 10k sq ft</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rebates</th>
<th>$</th>
<th>$</th>
<th>$</th>
<th>$$$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Policy Tool</th>
<th>T24 Energy Code +15% (Path to Zero Net Energy)</th>
<th>T24 Energy Code (Path to Zero)</th>
<th>Retrofit on resale, green labels in County records</th>
<th>Greatest Opportunity</th>
</tr>
</thead>
</table>

| Outcomes | Motivated market. >40% of rentable office = LEED EB O&M | LEED CI is common | 1% of units are green certified | |
|----------|---------------------------------------------------------|------------------|--------------------------------|
Scope
- Existing Commercial

Composition
- Owners’ Representatives
- Property Managers
- Contractors
- Operators
- Engineers
- Architects
- Finance
- Utilities

The Task
- Cost effective energy savings
- Minimum costs
- Measureable
What Is Measured Gets Managed.

- Peter Drucker
All commercial buildings must have:

- A Benchmark
- An Action Plan
- Transparency
3 year phase-in: 2011-2014

**Mandatory:**
- Benchmarking + limited public disclosure (annual)
- Energy audit or retrocommissioning (every 5 years)

**Voluntary:**
- Capital improvements
- Operations and calibration
- Tenant engagement
- Financing & incentives
- Policy as Customer Relationship Management
Private Sector Building Stock Affected

Buildings

- 43%
- 32%
- 25%

Floor Area

- 79%
- 10%
- 11%

Aggregate Energy Use
(PG&E Proxy Benchmark)

- >50k: 75%
- 25k - 50k: 9%
- 10k - 25k: 9%
- 0-10k sq ft: 7%

Building Size (square feet):
- orange: >50k
- red: 25k - 50k
- blue: 10k - 25k
- green: 0-10k sq ft
Does Energy Benchmarking Work?
SFPUC Report:

- 446 buildings, 26 agencies, 46M sq ft
- 79% outperform national median
- Qualify for ENERGY STAR:
  - 11 of 33 ratable buildings
  - 42 of 109 schools
- 5 sites rank in bottom 25% compared to national peers
- Carbon reduction:
  - 5% since 2011
  - 7% since 2009
Does Benchmarking Save Energy?

EPA Study:
35,000 buildings that benchmarked for 4 years

Average benefits:
- 2.4% annual energy use reduction
- 7% average savings over 4 years
- Buildings with the lowest scores improved the most.

Early Observations from benchmarking San Francisco

Median office ENERGY STAR score is >80
– 93% of floor area reporting a score >75 has been 3rd party verified via
  • Audit
  • ENERGY STAR certification
  • LEED EB

Floor area reporting to date by sector:
- Office 69%
- Hotel 15%
- Retail 4%
- Non-Refr. Warehouse 3%
- All Other 9%
Audit Requirements

- Preliminary Energy Use Analysis
  - Benchmark
- Level 1: Walk-through
  - 10k to 50k sq ft
- Level 2: Energy Survey & Analysis
  - >50k sq ft
    - Cost & Savings for LEEDs
      - O&M Changes
  - Detailed Survey & Analysis
    - Refined analysis
    - Additional Measurements
    - Hourly Simulation
New(er) Buildings

“By benchmarking and identifying inefficiencies through an audit, we maximized savings without sacrificing our customers’ experience.”

Peter Koehler
General Manager
InterContinental San Francisco
Historic Buildings

- 290,000 sq ft historic landmark
- Level 2 Audit in Q3 2012
- Updated lighting and HVAC controls
- $1.2M estimated lifetime savings

Sources: Carbon Lighthouse, Flood Building management
Pier 1: Prologis Headquarters

- $1.4 million investment
- Positive cash flow
- 32% energy cost reduction
- 30 jobs
- $3.7M in economic activity

Projects Completed:

- Retrocommissioning
- Lighting
- 200kW photovoltaic array
Audits: Uncovering Value
The first 120 Level II audits:

- $10,000,000
- $20,000,000
- $30,000,000
- $40,000,000
- $50,000,000

Assumptions:
- 6% discount rate
- 0% utility cost escalation
- Period = Expected Useful Life

Annual Electric Savings (MWh)

Net Present Value
Lessons Learned

- Patience
- Quality inventory of building stock
- Utility and state regulator support
- Market segmentation
- Communication
- Incentives/buy-in
Key Challenge: Access to Data

Source: Institute for Market Transformation
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Tool</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review other cities’ policies</td>
<td>Policy maps</td>
<td><a href="http://www.buildingrating.org">www.buildingrating.org</a></td>
</tr>
<tr>
<td></td>
<td>Reports summarizing benefits</td>
<td></td>
</tr>
<tr>
<td>Model policy</td>
<td>Benchmark: Fact sheets, policy design guide and sample language</td>
<td>SEE Action Work Group (US DOE)</td>
</tr>
<tr>
<td></td>
<td>Audit: Same resources under development</td>
<td></td>
</tr>
<tr>
<td>Manage compliance data</td>
<td>DOE SEED database</td>
<td>US Dept of Energy EERE Program</td>
</tr>
<tr>
<td></td>
<td>Building Performance Database</td>
<td><a href="http://energy.gov">http://energy.gov</a></td>
</tr>
<tr>
<td></td>
<td>Building Energy Data Exchange Specification</td>
<td></td>
</tr>
<tr>
<td>Benchmark buildings</td>
<td>ENERGY STAR Portfolio Manager</td>
<td><a href="http://www.energystar.gov/benchmark">www.energystar.gov/benchmark</a></td>
</tr>
</tbody>
</table>
San Francisco Green Building Code
Existing Commercial Buildings Policy
Central Corridor EcoDistrict

Barry Hooper
barry.hooper@sfgov.org
Ph: (415) 355-3700
San Francisco Dept of Environment

California:
CA Zero Net Energy Strategic Plan
ARUP Zero Net Energy Study
California Executive Order B-18-12
CA Green Building Action Plan

www.sfdbi.org
www.sfenvironment.org/ecb
http://tinyurl.com/sfccecodistrict

tinyurl.com/CAZNEPlan
tinyurl.com/ARUPZNEFeasibility
tinyurl.com/GovGreenOrder
tinyurl.com/CaGBAction
## Summary of Existing Commercial Buildings Ordinance

<table>
<thead>
<tr>
<th><strong>Applies to:</strong></th>
<th><strong>Non-residential buildings with 10,000 square feet or more of conditioned space</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requires</strong></td>
<td>All energy used by the building, and basic descriptive characteristics. May be done in-house.</td>
</tr>
<tr>
<td><strong>Audit/Retrocommissioning</strong></td>
<td>Assessment by a qualified professional identifying cost-effective opportunities to save energy. (May alternately be retrocommissioning.)</td>
</tr>
<tr>
<td><strong>Tool:</strong></td>
<td>ENERGY STAR Portfolio Manager</td>
</tr>
<tr>
<td><strong>Frequency:</strong></td>
<td>Annually, starting: Every 5 years</td>
</tr>
<tr>
<td>&gt;50k sq ft: Oct 2011</td>
<td>25k-50k sq ft: April 2012</td>
</tr>
<tr>
<td><strong>Exemptions</strong></td>
<td>New or unoccupied buildings, <em>(De Facto: whole building transaction in prior calendar year)</em></td>
</tr>
<tr>
<td></td>
<td>Buildings that are new, unoccupied, in financial distress, earned LEED EB, or earned ENERGY STAR 3 of the past 5 years</td>
</tr>
</tbody>
</table>
# Relation to California Law

<table>
<thead>
<tr>
<th>SF ECB Ordinance</th>
<th>California AB1103</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires</td>
<td>Benchmark and Audit</td>
</tr>
<tr>
<td>Trigger</td>
<td>Annual</td>
</tr>
<tr>
<td>Tool</td>
<td>ENERGY STAR Portfolio Manager</td>
</tr>
<tr>
<td>Data required</td>
<td>Monthly energy consumption for the entire building and Basic characteristics (size, occupancy, use, hours of operation)</td>
</tr>
</tbody>
</table>
| Data Disclosed                   | Summary of annual energy performance:  
  • 1 to 100 rating  
  • Energy use per sq ft per year  
  • GHG emissions from operations |
| Disclosure :                     | Public            | Counterparty in transaction (available to CEC) |
A Map to Frame Discussion About Energy Data

Time

Space

Seconds

Block Group

City/Region

Months

Year

A

B

C

D
<table>
<thead>
<tr>
<th>Utility</th>
<th>Minimum meters to share whole building monthly data with owner</th>
<th>City with Benchmarking Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConEdison (NY)</td>
<td>2 (i.e. no threshold)</td>
<td>NYC</td>
</tr>
<tr>
<td>Avista Utilities (WA)</td>
<td>2</td>
<td>Seattle</td>
</tr>
<tr>
<td>Seattle City Light (WA)</td>
<td>2</td>
<td>Seattle</td>
</tr>
<tr>
<td>Commonwealth Edison (IL)</td>
<td>4</td>
<td>Chicago</td>
</tr>
<tr>
<td>Austin Energy (TX)</td>
<td>4 (4/80 rule)</td>
<td>Austin</td>
</tr>
<tr>
<td>Puget Sound Energy (WA)</td>
<td>5</td>
<td>Seattle</td>
</tr>
<tr>
<td>Pepco (DC)</td>
<td>5</td>
<td>DC</td>
</tr>
<tr>
<td>Colorado PUC (CO)</td>
<td>15/15 rule</td>
<td>(Boulder?)</td>
</tr>
<tr>
<td>Pacific Gas &amp; Electric</td>
<td>100% consent required</td>
<td>San Francisco</td>
</tr>
</tbody>
</table>