Can Audits and RCx Requirements Accelerate Efficiency?
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San Francisco Department of the Environment
San Francisco Citywide Greenhouse Gas Emissions

- Building Energy: 52%
- Transportation: 43%
- Waste: 5%

5.3 Million Metric Tons
• SF Energy Watch partnership with PG&E

• Energy Star & EBOM market penetration
  • ~90M sq ft of each

• GreenFinance SF Commercial PACE program

• PG&E support for benchmarking training
San Francisco
Existing Commercial Buildings Ordinance

3 year phase-in: 2011-2014

**Mandatory:**
- Annual benchmarking
- Energy audit or retrocommissioning every 5 years

**Voluntary:**
- Capital improvements
- Operations and calibration
- Tenant engagement
- Financing & incentives

Policy is an on-ramp for efficiency services
## San Francisco
### Existing Commercial Buildings Ordinance

#### Energy Benchmarking

<table>
<thead>
<tr>
<th>Applies to:</th>
<th>Non-residential buildings with 10,000 square feet or more of conditioned space</th>
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<tbody>
<tr>
<td>Requires</td>
<td>Tracking monthly energy used by the entire building, and basic descriptive characteristics.</td>
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<td>Tool:</td>
<td>ENERGY STAR Portfolio Manager</td>
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<td>Frequency:</td>
<td>Annually, phased in by gross floor area:</td>
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<td>&gt;50k sq ft: Oct 2011  25k-50k sq ft: April 2012  10k-25k sq ft: April 2013</td>
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#### Audit/Retrocommissioning

| Requires | Assessment by a qualified professional identifying cost-effective opportunities to save energy. |
| Tool:    | ASHRAE Procedures for ...Audits “Level 2” for ≥50k sq ft “Level 1” for <50k sqft OR: Retrocommissioning |
| Frequency: | Every 5 years |
| Exemptions | Due dates assigned to distribute audits over 3 year phase-in |

### Exemptions

- New or unoccupied buildings, Factory occupancy
  
  *(De Facto: whole building transaction in prior calendar year)*

- Circumstance: Buildings that are new or newly renovated, unoccupied, in financial distress
  
  No exemption specific to low energy use.

- Performance: LEED EBOM certified, or earned ENERGY STAR 3 of the past 5 years
City Facilities

SFPUC Reports:
- 446 buildings
- 46M square feet
- 79% perform above national median
- Carbon reduction:
  - 6% since 2012
  - 13% since 2009

More info: SFWater.org
A UNIQUE MARKET FOR SUSTAINABLE REAL ESTATE
Private Sector Commercial Buildings

1,847 facilities
155 million square feet
Benchmarking Compliance by Floor Area

50K+ Square Feet

- 2010: 83%
- 2011: 83%
- 2012: 81%
- 2013: 82%
- 2014: 76%

25-50K Square Feet

- 2010: 53%
- 2011: 53%
- 2012: 46%
- 2013: 48%
- 2014: 52%

10-25K Square Feet

- 2010: 41%
- 2011: 36%
- 2012: 39%
Consistently complying buildings reported an annual average reduction of 3% - consistent with the 2.5% annual average improvement target suggested by Existing Commercial Building (115 properties).
Local trends are consistent with national


US EPA Study:
• 35,000 buildings nationally 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.
San Francisco 2014 Performance Snapshot - Office

With high occupancy and growing property values, median reported office site energy intensity is 27% below the national median.
In 2014, San Francisco hotels reported energy consumption equal to the national average - while serving 36% more guests than the national average.

Office Energy Performance and Climate in US Cities

San Francisco office buildings reported the lowest energy use and among the highest ENERGY STAR scores.
Energy Use and Economic Growth: Decoupled

Commercial real estate value increased by nearly 80%, jobs increased 11% and energy use in commercial buildings declined 2%

Benchmarking Summary

**Good News**
- Promising trends
- Data released!
- PG&E technical and educational support
- Professional stakeholder buy-in

**Challenges**
- Communication & staffing
- Data access for benchmarking
- Owner resources & policy fit vary by market segment
- Changes in partner procedures
- Software maturation
Audit Results
Audit requirement

- **Level 1: Walk-through**
  - 10k to 50k sq ft

- **Level 2: Energy Survey & Analysis**
  - >50k sq ft

- **Level 3: Detailed Survey & Analysis**
  - Refined analysis
  - Additional Measurements
  - Hourly Simulation

Preliminary Energy Use Analysis

Benchmark
Audit Compliance

79% of affected floor area has either undergone an audit in recent years or earned an operational certification.

Exempt: 2%
Did not comply: 19%
Complied: 44%
ENERGY STAR or LEED EBOM: 35%
Audits to Date

Owners have thus far chosen

• Licensed PEs
• Audits more often than retrocommissioning
Owners are choosing

- Licensed PEs
- Audits more often than retrocommissioning
Audit & RCx Workforce
Energy Savings Opportunity

Engineers reported an investment of $60.6 million in energy efficiency in 817 audited buildings would yield $25 million in energy savings and save 150 GWh.
The Challenge:
Realizing the Opportunity for Savings

Ingredients for Action
- Engineering talent
- Owner attention
- Actionable data
- Incentives
- Financing

Average Simple Payback
Through benchmarking and an audit, we maximized savings without sacrificing our customers’ experience.

Peter Koehler
General Manager
InterContinental
San Francisco

Audit found $1.2M savings
Updated lighting and HVAC controls
Prologis Headquarters
• $1.4 million invested
• Positive cash flow
• Cut energy cost 32%
• 30 jobs, $3.4M economic impact

Project:
• Retrocommissioning
• Lighting retrofit
• 200kW photovoltaic array
Community Benefit Organizations

• Lesser energy consumption & spend
• Limited resources
• Cutting cost would aid their mission

Can audit cost be reduced without compromising quality?
Alternate conceptual approach

Field assessment of targeted measures

+ Operational Analytics  OR  Simplified Simulation

DEMAND MAP (ELECTRICITY(KW))

Retroficiency – Virtual Audit

Autodesk - Rapid Energy Model
Learn more

Existing Commercial Buildings Ordinance
Green Building Code
Priority Permitting

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

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