



# Commercial & Industrial (C&I) Energy Efficiency Requirements Working Group

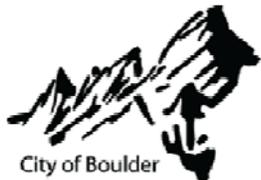
City of Boulder  
Friday, January 23, 2015



# Agenda



- Key Definitions
- Background on efficiency requirements
- Dive into the details of the City of Boulder potential efficiency requirements
- What types of energy services (possibly provided by a new municipal electric utility) would be most valuable to Boulder businesses and building owners?



# What will the ordinance cover?

Investing in Better Buildings



- Council has directed staff to develop options for mandatory Rating + Reporting (R+R) and Efficiency Requirements for commercial and industrial buildings.
- Rating + Reporting Options:

Which buildings  
(size/type) will  
be covered?

Exemptions

Disclosure of  
Energy Use  
Information

Enforcement

Phasing/Timing

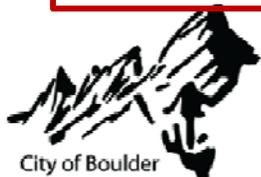
- Efficiency Requirement Options:

**TODAY**

Which buildings  
(size/type) will be  
covered?

Exemptions

Phasing/Timing



# Key Definitions



## Covered Property

This Ordinance will define “Covered Property” by stating something like the following:

- i. *Any city owned building with 5,000 gross square feet or more.*
- ii. *Any commercial or industrial building with 20,000 gross square feet or more.*
- iii. *All commercial or industrial portions of any mixed-use building where a total of at least 20,000 gross square feet is devoted to any commercial or industrial use.*

## Manufacturing Building

“Any building which has a primary use of assemblage, processing, and/or manufacturing products from raw materials or fabricated parts”

## Building

Most ordinances don’t define what a “building” is – the ones that do simply say it is a structure that encloses a use or occupancy.

- Proposed Definition for Boulder: “any structure enclosing any use or occupancy, associated with a distinct property address”

## Gross Square Footage

Means the total number of square feet measured between the exterior surfaces of the enclosing fixed walls of a building. This includes vent shafts, elevator shafts, flues, pipe shafts, vertical ducts, stairwells, light wells, basement space, mechanical or electrical rooms, and interior parking.

# C&I Rating +Reporting Ordinances

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City	Date Enacted	Date Effective	Gov't/ Comm	Disclosure <sup>1</sup>	Energy Efficiency?
Austin	Nov 2008	June 2011	10K SF+	B, T, G	Audits
Boston	May 2013	May 2014	All/35K SF+	P, G	Audits
Cambridge	July 2014	Dec 2014	25K SF+	P, G	---
Chicago	Sept 2013	June 2014	50K SF+	P, G	---
District of Columbia	July 2008	April 2013	10K/ 50K SF+	P, G	---
Minneapolis	Jan 2013	May 2014	25K/ 50K SF+	P, G	---
NYC	Dec 2009	Aug 2011	10K/ 50K SF+	P, G	Audits, RCx, Lighting, Sub-metering
Philadelphia	June 2012	Oct 2013	50K SF+	P, G, B, L	---
San Francisco	Feb 2011	Oct 2011	10K SF+	P <sup>2</sup> , G, T, B, L <sup>3</sup>	Audits, RCx
Seattle	Jan 2010	Oct 2011	10K SF+	B, G, T, L	---

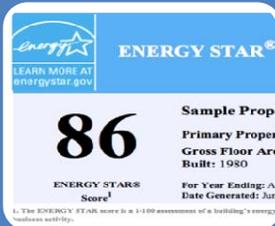
<sup>1</sup> P = Public, G = Government, B = Buyers, T = Tenants, L = Leasers & Lenders

<sup>2</sup> Discloses summary of compliance, but not building energy use

<sup>3</sup> CA's statewide initiative, AB 1103, requires buildings to disclose energy performance at point of transaction

# Ordinance Example - NYC

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## Local Law 84: Benchmarking (in progress now)

- annual requirement to benchmark energy and water use
- benchmarking data made available to the public



## Local Law 87: Energy Audits & RCx (phasing in 2013-2022)

- Energy audit and retro-commissioning once every 10 years



## Local Law 88: Lighting & Sub-metering (2025)

- lighting in non-residential spaces must meet code (LL85)
- large commercial tenants provided with sub-meters and monthly energy statements

# Boulder County CECO Analysis

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## “Commercial Energy Conservation Ordinance (CECO) Analysis”, December 2012, Group 14

- Examine potential energy efficiency requirements for commercial buildings in Boulder County
- Focus on cost effective reduction of energy use and GHG emissions
- Measures drawn from the BetterBuildings EnergySmart, Boulder County, CO rebate program and Group14’s audit experience.

## Summary of Recommendations

1. Phase out of inefficient lighting technology
2. Energy Rating and Reporting (benchmarking & Disclosure)
3. Energy audits for low performing buildings
4. Whole Building Lighting Power Density Requirements
5. Minimum performance requirements for equipment at end of life (specifications for HVAC, refrigeration, office equip, food service equip,. Etc)



# CECO Analysis: Options and Savings



Group 14 Recommendations	Phasing	COB Potential Savings (metric tons of CO2/yr)	COB Potential Savings (\$/yr)
Phase out Inefficient Lighting	Year 2	235	\$34,500
Rating and Reporting	Year 2	not quantified	not quantified
Energy Audit/RCx for Below Average Buildings* <small>*&gt;50K S.F. with Score &lt; 50 or &gt;25K S.F. with energy costs of \$1.50/S.F. or more</small>	Year 3	not quantified (will vary with building specific needs)	not quantified (will vary with building specific needs)
Whole Building Lighting Power Density Requirements	Year 5	13,700	\$1.6 million
Min. Standards: Non-Lighting Systems Replacement	Year 5	10,400 to 20,800	\$1.5 million to \$3.0 million

*If recommended strategies were implemented at ALL applicable buildings in the City of Boulder:*

- Annual estimated cost savings may be ~\$3.1 - \$4.6 million*
- Annual estimated reductions may be ~24,000 – 35,000 metric tons CO<sub>2</sub> per year*



# City of Boulder Climate Commitment Tool



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Requirements	COB Potential Savings in 2050 (metric tons of CO <sub>2</sub> /yr)
Phase out inefficient lighting	~200
Rating + Reporting	~18,000
Energy Audit/RCx for Large Buildings	~12,500
Min. ENERGY STAR Portfolio Manager score or max EUI for below average buildings	~45,000
<b>Total</b>	<b>~75,000</b> (~15% reduction in 2050 GHG emissions from private sector C&I buildings)

*In 2050, the business as usual GHG emissions for the entire city are estimated to be 1.3 million metric tons of CO<sub>2</sub>/yr*



# Options for Efficiency Requirements

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## PRESCRIPTIVE

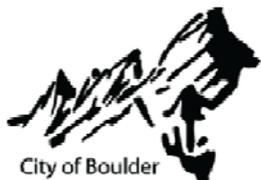
- Audits and/or RCx every x years
- Lighting must meet current energy codes (NYC)
- No T12s or incandescents
- Minimum standards upon replacement

## PERFORMANCE

- TBD after x years of benchmarking data
- Could include:
  - Min. ENERGY STAR score of X
  - x% reduction in normalized EUI from previous year

### Discussion Questions:

- Should there be requirements for the services providers who conduct the audits or RCx?
- What other specific requirements would save a significant amount of energy and have attractive financial returns?



# Energy Services

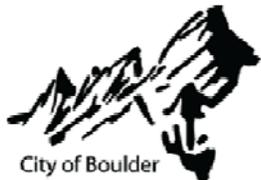
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- What energy services do you currently take advantage of?
- What new services are needed to support the ordinance?
- What future energy services would you like to see developed?

## Energy Services Include

- energy efficiency
- demand response
- distributed generation
- green pricing programs (ex: voluntary wind energy purchase)
- enhanced backup, power quality and redundancy services
- energy management to facilitate customer choice behind the meter
- behind the meter research, development and innovation projects
- financing options (ex: on-bill financing)
- data analysis/interpretation to help customers better understand their usage



City of Boulder

Meeting

# Discussion

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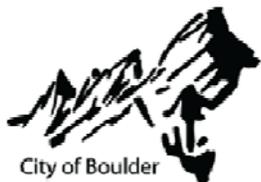


# Closing Logistics

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- Meeting dates and times
- Meeting #4 Agenda
- Questions and comments



# DETAILED TABLES FOR REFERENCE

# Boulder County Study - Tables for Reference (Lighting only)

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TABLE 10: IMPLEMENTATION ANALYSIS FOR LIGHTING MEASURES

Area	Boulder County Existing Building Stock (Total Buildings / Projects)	Building Stock by City (%)	Total Energy Smart Lighting Projects	Total Energy Smart Lighting Rebates	Rebates by City (%)	Current Penetration Rates	Total Existing Buildings for Full Implementation	Existing Building Stock for Full Implementation (%)
<i>Boulder County Total</i>	3808	-	714	1591	-	21%	2713	78%
<i>City of Boulder</i>	1904	50.0%	436	972	61.1%	13%	1277	37%
<i>Lafayette</i>	314	8.2%	22	48	3.0%	1%	261	8%
<i>Longmont</i>	1045	27.4%	163	363	22.8%	5%	778	23%
<i>Louisville</i>	361	9.5%	30	66	4.1%	1%	295	9%
<i>Superior</i>	28	0.7%	0	0	0.0%	0%	25	0.7%
<i>Erie</i>	16	0.4%	0	0	0.0%	0%	14	0.4%
<i>Other</i>	156	4.1%	64	142	8.9%	2%	N/A	N/A

Area	Current Penetration kWh Savings	Current Penetration CO2 (metric Tons) Savings	Full Implementation Estimated kWh Savings	Full Implementation Estimated CO2 (metric tons) Savings
<i>Boulder County Total</i>	10,998,718	7,584	41,346,742	28,511
<i>City of Boulder</i>	6,719,519	4,634	19,944,041	13,753
<i>Lafayette</i>	331,828	229	4,065,419	2,803
<i>Longmont</i>	2,509,450	1,730	12,124,699	8,361
<i>Louisville</i>	456,264	315	4,599,170	3,171
<i>Superior</i>	0	0	392,111	270
<i>Erie</i>	0	0	224,064	155
<i>Other</i>	981,658	677	N/A	N/A



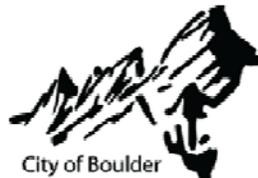
# Boulder's Private Sector Commercial Buildings

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Size Category (SQFT)	Total SQFT	Number of Buildings	Proportion of Buildings at Size Cutoffs (e.g. >5,000 sf is 97% of sqft)
< 5,000	1,111,737	393	100%
5,000-9,999	2,268,112	318	97% of sqft, 74% of bldgs
10,000-19,999	5,276,787	375	90% of sqft, 54% of bldgs
20,000-29,999	4,088,380	166	73% of sqft, 29% of bldgs
30,000-39,999	2,986,804	87	61% of sqft, 18% of bldgs
40,000-49,999	2,210,437	50	52% of sqft, 13% of bldgs
50,000 and above	14,529,366	147	45% of sqft, 10% of bldgs
<b>TOTAL</b>	<b>32,471,623</b>	<b>1,536</b>	

Building Type	Bldgs (#)	Bldgs (%)	Rentable Area (SQFT)	Rentable Area (%)	Avg Bldg SQFT
Flex*	161	10.5%	5,470,144	16.8%	33,976 sqft
Industrial	247	16.1%	6,053,035	18.6%	24,506 sqft
Commercial	1,128	73.4%	20,948,444	64.5%	18,571 sqft
Total	1,536		32,471,623		



Source: CoStar, 10/10/2014

Includes: Existing Properties Only

DOES NOT INCLUDE: Multi-Family

\* Flex: Mix of office (≥50% sf) and light industrial/R&D

# City of Boulder Buildings

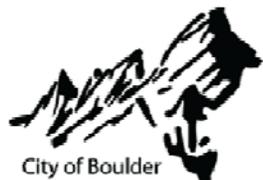
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Size Category (SQFT)	Total SQFT	Number of Buildings	Proportion of Buildings at Size Cutoffs (e.g. >5,000 sf is 93%)	
<5,000	189,447	149		
5,000-9,999	164,456	26	93% of sqft,	33% of bldgs
10,000-19,999	303,993	23	88% of sqft,	21% of bldgs
20,000-29,999	119,999	5	77% of sqft,	10% of bldgs
30,000-39,999	195,310	6	73% of sqft,	8% of bldgs
40,000-49,999	0	0	66% of sqft,	5% of bldgs
50,000 and above	1,868,509	12	66% of sqft,	5% of bldgs
<b>TOTAL</b>	<b>2,841,714</b>	<b>221</b>		

## Notes:

- Include parking structures as a pilot?
- There are many large storage buildings with low energy use.
- Consider a requirement to benchmark the subset of buildings that makes up 80% of the building stock's energy use or cost



# C&I Rating +Reporting Ordinances

Investing in Better Buildings



City	Date Enacted	Date Effective	Gov't/ Comm	Disclosure <sup>1</sup>	Energy Efficiency?
Austin	Nov 2008	June 2011	10K SF+	B, T, G	Audits
Boston	May 2013	May 2014	All/35K SF+	P, G	Audits
Cambridge	July 2014	Dec 2014	25K SF+	P, G	---
Chicago	Sept 2013	June 2014	50K SF+	P, G	---
District of Columbia	July 2008	April 2013	10K/ 50K SF+	P, G	---
Minneapolis	Jan 2013	May 2014	25K/ 50K SF+	P, G	---
NYC	Dec 2009	Aug 2011	10K/ 50K SF+	P, G	Audits, RCx, Lighting, Sub-metering
Philadelphia	June 2012	Oct 2013	50K SF+	P, G, B, L	---
San Francisco	Feb 2011	Oct 2011	10K SF+	P <sup>2</sup> , G, T, B, L <sup>3</sup>	Audits, RetroCx
Seattle	Jan 2010	Oct 2011	10K SF+	B, G, T, L	---

<sup>1</sup> P = public, G = government, B = buyers, T = tenants, L = leasers & lenders

<sup>2</sup> Discloses summary of compliance, but not building energy use

<sup>3</sup> CA's statewide initiative, AB 1103, requires buildings to disclose energy performance at point of transaction

City	Building Size, Type
Austin	Commercial buildings >10 years old
Boston	All public, government, multifamily, and private non-residential buildings
Cambridge	Municipal buildings over 10,000 sf, Non-residential buildings over 25,000 sf
Chicago	Municipal and commercial buildings 50,000 – 250,000 sf Residential buildings 50,000 – 250,000 sf
District of Columbia	Public/Government Buildings $\geq$ 10,000 sf Non-Residential and Multi-Family $\geq$ 50,000 sf
Minneapolis	Public/gov't buildings $\geq$ 25,000 sf Non-Residential Buildings $\geq$ 50,000 sf
NYC	Public/Government Buildings $\geq$ 10,000 sf Non-Residential and Multi-Family $\geq$ 50,000 sf
Philadelphia	Public/Gov't, Non-Residential $\geq$ 50,000 sf
San Francisco	All private sector nonresidential buildings $\geq$ 10,000 sf
Seattle	Multifamily and non-residential buildings $\geq$ 20,000 sf

City	Date Effective	Phasing/Timing based on Building Type & Size Thresholds
Austin	June 2011	Commercial buildings >10 years must report annually: June 2012: ≥75,000 sf (Tier 1) June 2013: ≥30,000 and <75,000 sf (Tier 2) June 2014: ≥10,000 and <30,000 sf (Tier 3)
Boston	May 2014	All public, government, multifamily, and private non-residential buildings: June 2013: ALL Public/Gov't Buildings Sept 2014: Non Residential ≥ 50,000 sf, May 2015: Multifamily ≥50 units or 50,000 sf May 2016: Non-Residential ≥ 35,000 sf, May 2017: Multifamily ≥35 units or 35,000 sf
Cambridge	Dec 2014	Oct 2014: Municipal buildings over 10,000 sf May 2015: Non-residential buildings over 50,000 sf and Multi-family residential buildings 50+units May 2016: Non-residential buildings over 25,000 sf
Chicago	June 2014	June 1, 2014: Municipal and commercial buildings ≥ 250,000 sf June 1, 2015: Municipal and commercial buildings 50,000 – 250,000 sf June 1, 2015: Residential buildings ≥ 250,000 sf June 1, 2016: Residential buildings 50,000 – 250,000 sf
District of Columbia	April 2013	Public/Government Buildings: April 2010: ≥10,000 sf Non-Residential and Multi-Family:: April 2013: ≥ 100,000 sf April 2014: ≥ 50,000 sf
Minneapolis	May 2014	Public/gov't buildings: May 2013: ≥ 25,000 sf Non-Residential Buildings: May 2014: ≥ 100,000 sf May 2015: ≥ 50,000 sf
NYC	August 2011	Public/Government Buildings: May 2010: ≥10,000 sf Non-Residential and Multi-Family:: May 2011: ≥ 50,000 sf
Philadelphia	Oct 2013	Public/Gov't, Non-Residential: June 2014: ≥ 50,000 sf
San Francisco	Oct 2011	All private sector nonresidential buildings: Oct 2011: ≥50,000 sf Apr 2012: ≥25,000 sf Apr 2013: ≥10,000 sf
Seattle	Oct 2011	Multifamily and non-residential buildings: April 2013: ≥20,000 sf

City	Enforcement - Fines (typically 30-45 days after written notice, if not addressed)	Compliance Rate (%)
Austin	Up to \$500 (Class C misdemeanor), \$2,000 (if criminal negligence)	76% for Tier 1
Boston	\$200 per day (>50,000 sf) \$75 per day (35,000-49,999 sf)	pending
Cambridge	\$300/day fine after 1st written warning	pending
Chicago	\$100 for the first violation \$25/day that the violation continues	pending
District of Columbia	\$100/day	83%
Minneapolis	Daily fine TBD, pursuant to Chapter 2 and the schedule of civil fines	pending
NYC	\$500 for 1 <sup>st</sup> violation \$500/quarter with a maximum of \$2,000 for continued violations.	75%
Philadelphia	\$300 fine for the 1st 30 days, and then \$100/day	90%
San Francisco	\$100 /day, up to a maximum of \$2,500 per violation (≥25,000 sf) \$50 /day, up to a maximum of \$1,500 per violation (<25,000 sf)	79%
Seattle	\$1,000/quarter, \$4,000 per year (≥50,000 SF or greater) \$500/quarter, \$2,000 per year (20,000 to 49,999 SF) +Disclosure Request violation: \$150 fine, \$500 fine for subsequent violations	93%

City	Disclosed to?	Building Info	EUI	GHG	Other Disclosed Info
Austin	B, T, G				Energy rating calculation disclosed to relevant parties in real estate transactions.
Boston	P, G	✓	✓	✓	Energy Star rating, and where available, water consumption per square foot
Cambridge	P, G	✓			Will disclose info online, specifics tbd
Chicago	P, G				Energy consumption and performance scores
District of Columbia	P, G	✓	✓	✓	Property id, address, owner, property type, year built, Energy Star Score, floor area, electricity use, natural gas use, district steam use, other fuel use (based on actual data available on WDC website)
Minneapolis	P, G	✓	✓	✓	water use and energy performance score, where applicable,
NYC	P, G	✓	✓	✓	Weather normalized source EUI, Indoor water intensity, Energy Star Score, floor area
Philadelphia	P, G, B, L	✓	✓		
San Francisco	P <sup>2</sup> , G, T, B, L <sup>3</sup>	✓	✓	✓	Aggregate data disclosed only - weather normalized source EUI, Indoor water intensity, Energy Star Score, floor area
Seattle	B, G, T, L		✓		No public disclosure required., must report EUI and EnergySTAR scores to tenants, leasees, and potential buyers.

<sup>1</sup> P = public, G = government, B = buyers, T = tenants, L = leasers & lenders

<sup>2</sup> Discloses summary of compliance, but not building energy use

<sup>3</sup> CA's statewide initiative, AB 1103, requires buildings to disclose energy performance at point of transaction

City	Efficiency Requirements	Efficiency Details
Austin	Audits & mandatory upgrades for multifamily buildings, voluntary actions for commercial	The Austin City Council has set the following voluntary goals based on EnergySTAR ratings: 75 or higher - No action necessary 63-74 - Raise the score to at least 75 42-62- Raise the score by 20% Below 42- Raise the score to 50
Boston	energy audits	Buildings registering poor energy, emissions, and water performance--and not demonstrating improvement--will be required to undertake energy assessments or audits every five years.
Cambridge	Referring to net zero task force and other resources	The City is considering options to require energy performance improvement actions of buildings that do not meet a minimum level of performance
NYC	ASHRAE level II audits & RCx, public building audits & upgrades	
San Francisco	Yes, ASHRAE level I or II audits every 5 years (with retroCx as an alternative)	Building owners must file a Confirmation of Energy Audit online. Audits must be completed by a qualified Energy Professional. Large facilities and buildings with complex systems are encouraged to consider retrocommissioning as an alternative to meet the audit requirement. Audits completed since 2008 may be used.
Seattle	No	Not required, but they do provide links to rebates and assistance available for energy efficiency ( <a href="http://www.seattle.gov/environment/buildings-and-energy/energy-benchmarking-and-reporting/save-energy---save-energy">http://www.seattle.gov/environment/buildings-and-energy/energy-benchmarking-and-reporting/save-energy---save-energy</a> )