BEPSDC Task Force

January 7, 2020

@DOEE_DC
#BEPSDC

DEPARTMENT OF ENERGY & ENVIRONMENT
GOVERNMENT OF THE DISTRICT OF COLUMBIA

WE ARE WASHINGTON DC
GOVERNMENT OF THE DISTRICT OF COLUMBIA
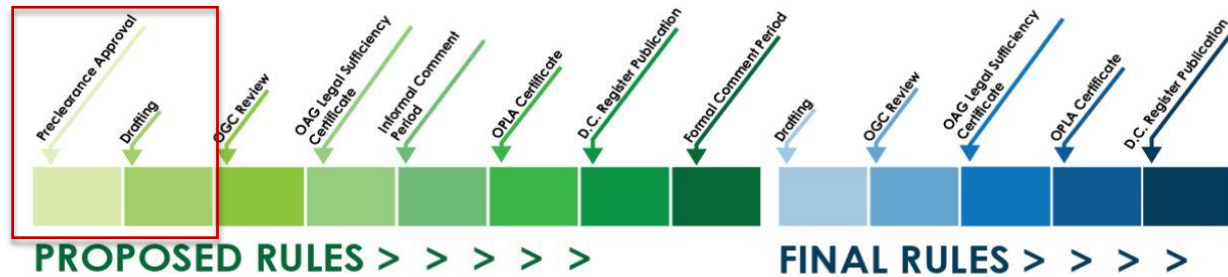MURIEL BOWSER, MAYOR

AGENDA

1. Administrative Items

2. Objectives

3. Property Types

4. Equivalent Metric

5. Announcements

OBJECTIVES

Role of Task Force:

- Advise DOEE on creation of an implementation plan for the Building Energy Performance Program;

- Recommend amendments to proposed regulations issued by DOEE; and

- Recommend complementary programs or policies.

RULEMAKING PROCESS

Preclearance Approval | Drafting | OGC Review | OAG Legal Sufficiency Certificate | Informal Comment Period | OPLA Certificate | D.C. Register Publication | Formal Comment Period

Drafting | OGC Review | OAG Legal Sufficiency Certificate | OPLA Certificate | D.C. Register Publication

PROPOSED RULES > > > > >

FINAL RULES > > > >

Stage	Description
Proposed Rules - Preclearance Approval	The Legislative Director requests approval to begin drafting a rulemaking from the Office of Policy and Legislative Affairs (OPLA) and the Deputy Mayor's Economic Development Office (DMPED). No formal memo is required, only a redline of changes to the existing regulations or a draft of new regulations
Proposed Rules - Drafting	The Program researches and drafts the rulemaking with guidance from the Legislative Director and the Office of the General Counsel (OGC).
Proposed Rules - OGC Review	OGC reviews the rulemaking for legal concurrence and recommends revisions to the rulemaking.
Proposed Rules - OAG Legal Sufficiency Certificate	The Legislative Director requests a Legal Sufficiency Certificate from the Office of the Attorney General, Legal Counsel Division (LCD). The Legislative Director and OGC work to resolve any questions or issues LCD has with the rulemaking.
Proposed Rules - Informal Comment Period	The Department receives and considers comments from stakeholders prior to publication in the D.C. Register and formal notice and comment. Depending on the rulemaking, this step may be omitted.
Proposed Rules - OPLA Certificate	The Legislative Director requests the OPLA Certificate from the Executive Office of the Mayor, which requires approval from DMPED, Office of the City Administrator, the Mayor's General Counsel, the Mayor's Chief of Staff, and the OPLA Director.
Proposed Rules - D.C. Register Publication	The Legislative Director submits the rulemaking to the Office of Documents and Administrative Issuances for publication in the D.C. Register
Proposed Rules - Formal Comment Period	The Department receives and considers comments from stakeholders.

Stage	Description
Final Rules – Drafting	The Program makes any revisions to the rulemaking and summarizes comments and responses in the preamble of the final rulemaking with guidance from the Legislative Director and OGC.
Final Rules - OGC Review	OGC reviews the rulemaking for legal concurrence and recommends revisions to the rulemaking. OGC determines whether revisions qualify as substantive changes that require additional notice and comment or whether the rulemaking may be published as final.
Final Rules - OAG Legal Sufficiency Certificate	The Legislative Director requests the OPLA Certificate from the Executive Office of the Mayor, which requires approval from DMPED, Office of the City Administrator, the Mayor's General Counsel, and the OPLA Director.
Final Rules - D.C. Register Publication	The Legislative Director submits the final rulemaking to the Office of Documents and Administrative Issuances for publication in the D.C. Register.

BEPS TIMELINE

- 2018 Scorecards sent out in Fall 2019
- BEPS Task Force – meetings will commence in December
- Draft Rules ready for public comment mid-2020
- A minimum of 1 round of public comment open for 30 days
- Final rules published in late 2020
- 2019 Scorecards sent out – September 2020
- BEP Standard announced around December 2020
- First compliance period starts January 1, 2021

DISCUSSION GROUND RULES

- ❑ **Listen actively** – respect others when they are talking

- ❑ **Be concise** – watch wordiness and run on statements while explaining thoughts

- ❑ **Challenge ideas** –ask for clarification, do not make questions personal attacks

- ❑ **Speak from personal experience** – use personal experience or stories to convey ideas

- ❑ **Participate** – speak when you have a relevant and valuable contribution to make

- ❑ **Be aware of body language and nonverbal cues** – physical cues can be just as hurtful

- ❑ **Speak freely** – but share the floor with others, especially those who have been quiet

- ❑ **Things to avoid** – lecturing, not giving everyone a chance, side tracking the discussion

PROPERTY TYPES WG SCENARIOS

Section 301(b)(1)(A): No later than January 1, 2021, and every 5 years thereafter, <u>DOEE shall establish property types and building energy performance standards for each property type</u>, or an equivalent metric for buildings that do not receive an ENERGY STAR score.

<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Scenario 3</u>
DOEE will establish standards for **4 major property types** in the District: • Office • K-12 • Multifamily • Hotel All other buildings will be grouped into an "Other" category	DOEE will establish standards for all **Energy Star Portfolio Manager building type** definitions and define all standards for all building types available in Portfolio Manager where sufficient local District data is available.	DOEE will start by classifying buildings by **EPA Portfolio Manager property types** and then sub-divide buildings based on **property use details** (i.e. Multifamily will be broken into low-rise, mid-rise, and high-rise groupings; K-12 school will be broken into elementary/middle school and high school). Then DOEE will establish standards for each cohort.

PROPERTY TYPES FEEDBACK FROM WORKING GROUP

- Most liked Scenario #3
  - Concerned about data availability

- Need robust grouping to spark competition

- Breakdown should be more granular than scenario #1

- DOEE should run analysis to determine how we should classify building types

- Start with Scenario # 2 Portfolio Manager types for simplicity,
  - Get more/less granular if/when statistical analysis shows significant differences

POSSIBLE METHODOLOGY for ESTABLISHING TYPE DEFINITION

1. Initial property types will be based on the Primary Property Type Portfolio Manager Calculated in the [District Benchmarking Disclosure](#)

2. Combine property types to maintain integrity of ENERGY STAR Score by grouping all property types with [same scoring model](#) together.

3. Properties without an ENERGY STAR Score will then be grouped by "Reference Data Source – Peer Group Comparison" field in [EPA Portfolio Manager National Median Technical Reference](#).

4. Create Custom Property Type Groupings for properties without an ENERGY STAR Score so that groups have >=10 properties and have a statistically significant normal distribution for Source EUI.

Level 1: Disclosure Property Types

Initial property types will be based on the "Primary Property Type - Portfolio Manager Calculated" in the District Benchmarking Disclosure

Primary Property Type	Count
Multifamily Housing *	665
Office *	527
K-12 School *	133
Hotel *	105
College/University #	34
Residence Hall/Dormitory *	29
Mixed Use Property	19
Worship Facility *	17
Fire Station	15
Non-Refrigerated Warehouse *	15
Other	14
Fitness Center/Health Club/Gym	12
Library	12
Police Station	12
Supermarket/Grocery Store *	12
Other - Lodging/Residential	11
Self-Storage Facility	11
Medical Office *	10
Senior Care Community *	10
Social/Meeting Hall	8
Hospital (General Medical & Surgical)* #	6
Retail Store *	6
Other - Public Services	5
Strip Mall	5

Primary Property Type	Count
Urgent Care/Clinic/Other Outpatient #	4
Distribution Center *	3
Museum	3
Other/Specialty Hospital #	3
Adult Education	2
Drinking Water Treatment & Distribution	2
Enclosed Mall	2
Financial Office *	2
Other – Education	2
Other - Entertainment/Public Assembly	2
Other – Mall	2
Performing Arts	2
Wholesale Club/Supercenter *	2
Laboratory	1
Movie Theater	1
Other – Services	1
Other – Utility	1
Prison/Incarceration	1
Refrigerated Warehouse *	1
Repair Services (Vehicle, Shoe, Locksmith, etc)	1
Repair Services (Vehicle, Shoe, Locksmith, etc.)	1
Restaurant	1
Wastewater Treatment Plant *	1

* Can Receive the ENERGY STAR Score

Has special carve out in legislation

Level 2: ENERGY STAR Score Parent Models Types

Combine property types to maintain integrity of ENERGY STAR Score by grouping all property types with [same scoring model](#).

Grouping	Property Type Name	Count
Model Type -	Multifamily Housing	665
Model Type -	Office/Bank/Financial Office/Courthouse	529
Model Type -	K-12 School	133
Model Type -	Hotel	105
BEPS Carve Out -	College/University	34
Model Type -	Residence Hall/Dormitory/Barracks	29
Model Type -	Retail Store/Wholesale Club/Supercenter/Supermarket/Grocery Store	20
Disclosure -	Mixed Use Property	19 ←
Model Type -	Non-Refrigerated Warehouse/Distribution Center/Refrigerated Warehouse	19
Model Type -	Worship Facility	17
Disclosure -	Fire Station	15 ←
Disclosure -	Other	14 ←
BEPS Carve Out -	Hospital/Healthcare	13
Disclosure -	Fitness Center/Health Club/Gym	12 ←
Disclosure -	Library	12 ←
Disclosure -	Police Station	12 ←
Disclosure -	Other - Lodging/Residential	11 ←
Disclosure -	Self-Storage Facility	11 ←
Model Type -	Medical Office	10
Model Type -	Senior Care Community	10

Grouping	Property Type Name	Count
Disclosure -	Social/Meeting Hall	8 ←
Disclosure -	Other - Public Services	5 ←
Disclosure -	Strip Mall	5 ←
Disclosure -	Museum	3 ←
Disclosure -	Adult Education	2 ←
Disclosure -	Drinking Water Treatment & Distribution	2 ←
Disclosure -	Enclosed Mall	2 ←
Disclosure -	Other - Education	2 ←
Disclosure -	Other - Entertainment/Public Assembly	2 ←
Disclosure -	Other - Mall	2 ←
Disclosure -	Performing Arts	2 ←
Disclosure -	Laboratory	1
Model Type -	Wastewater/Drinking Water Treat. Plant	1
Disclosure -	Movie Theater	1 ←
Disclosure -	Other - Services	1 ←
Disclosure -	Other - Utility	1 ←
Disclosure -	Prison/Incarceration	1 ←
Disclosure -	Repair Services (Vehicle, Shoe, Locksmith, etc)	1 ←
Disclosure -	Repair Services (Vehicle, Shoe, Locksmith, etc.)	1 ←
Disclosure -	Restaurant	1 ←

Level 3: ENERGY STAR Score Parent Models & National Median Reference Types

Grouping	Property Type Name	Count	District Median Source EUI	National Median Source EUI
Model Type -	Multifamily Housing	665	111.6	118.1
Model Type -	Office/Bank/Financial Office/Courthouse	529	160.8	116.4
Model Type -	K-12 School	133	144.7	104.4
Model Type -	Hotel	105	187.4	146.7
National Median -	PBA - 91, Other	39	236.7	89.3
BEPS Carve Out -	College/University	34	193.5	180.6
Model Type -	Residence Hall/Dormitory/Barracks	29	131.8	107.5
National Median -	PBA PLUS - 16, Fire station/police station	27	185.7	124.9
Model Type -	Retail Store/Wholesale Club/Supercenter/Supermarket/Grocery Store	20	400.7	444.0
Model Type -	Non-Refrigerated Warehouse/Dist. Center/Refrigerated Warehouse	19	117.7	52.9
Model Type -	Worship Facility	17	142.3	58.4
BEPS Carve Out -	Hospital/Healthcare	13	371.8	206.7
National Median -	PBA PLUS - 23, Library	12	190.7	143.6
National Median -	PBA PLUS - 24, Recreation	12	250.6	112.0
National Median -	PBA - 18, Lodging	11	147.7	143.6
National Median -	PBA - 5, Nonrefrigerated warehouse (Self-Storage Facility)	11	29.5	47.8
Model Type -	Medical Office	10	171.8	121.7
Model Type -	Senior Care Community	10	248.3	213.2 ←
National Median -	PBA - 13, Public assembly	8	216.2	112.0 ←
National Median -	PBA PLUS - 25, Social/meeting	8	206.0	109.6 ←
National Median -	PBA - 23, Strip shopping mall	5	147.3	228.8 ←
National Median -	PBA - 14, Education	4	132.9	110.4 ←
National Median -	PBA - 26, Service	3	199.3	96.9 ←
National Median -	CBECS combination - 6, Mall	2	127.8	225.3 ←
National Median -	AWWA – Water Treatment Plant (Drinking Water Treat. & Distribution)	2	1392.2	5.9 ←
National Median -	PBA - 24, Enclosed mall	2	379.7	170.7 ←
Model Type -	Wastewater Treatment Plant	1	513.0	7.5 ←
National Median -	PBA - 4, Laboratory	1	265.3	318.2 ←
National Median -	PBA - 7, Public order and safety	1	343.1	156.4 ←
National Median -	PBA PLUS - 33, Restaurant/cafeteria	1	248.4	573.7 ←

Properties without an ENERGY STAR Score will then be grouped by "Reference Data Source – Peer Group Comparison" field in EPA Portfolio Manager National Median Technical Reference.

# Level 4: ENERGY STAR Score Parent Models & Nat'l Median Ref. Types & Custom Groupings

Create Custom Property Type Groupings for properties without an ENERGY STAR Score so that groups have >10 properties and have a statistically significant normal distribution for Source EUI.

| Grouping	Property Type Name	Count	District Median Source EUI	National Median Source EUI	District Median ENERGY STAR SCORE	P-Value
Model Type	Multifamily Housing	665	111.6	118.1	66	
Model Type	Office/Bank/Financial Office/Courthouse	529	160.8	116.4	69	
Model Type	K-12 School	133	144.7	104.4	36	
Model Type	Hotel	105	187.4	146.7	48	
➡ Custom	Other/Food Service/Laboratory	36	189.4	89.3		0.411
BEPS Carve Out	College/University	34	193.5	180.6		
Model Type	Residence Hall/Dormitory/Barracks	29	131.8	107.5	65.5	
➡ Custom	Fire Station/Police Station	27	185.7	124.9		0.443
➡ Custom	Public assembly/Education	25	201.5	143.6		0.23
Model Type	Retail Store/Whole. Club/Supercenter/Supermarket/Grocery	20	400.7	444.0	62	
Model Type	Non-Refrigerated Warehouse/Distribution Center/Refrigerated Warehouse	19	117.7	52.9	31.5	
National Median	Mixed Use Property	19	227.8	89.3		0.061
Model Type	Worship Facility	17	142.3	58.4	18.5	
National Median	PBA PLUS - 25,Social/meeting	17	194.2	170.7		0.463
BEPS Carve Out	Hospital/Healthcare	13	371.8	206.7		
National Median	PBA PLUS - 24, Recreation	12	250.6	112.0		0.087
National Median	PBA - 5, Nonrefrigerated warehouse (Self-Storage Facility)	11	29.5	47.8		0.086
Model Type	Medical Office	10	171.8	121.7	63	
Model Type	Senior Care Community	10	248.3	213.2	24.5	
➡ Custom	Wastewater/Drinking Water Treatment Plant	3	865.3	5.9	87	0.464

Statistical Tests of Level 4 Custom Type Groupings

Analysis shows there is an equitable distribution of Portfolio Manager Property Types in the Custom Property Types

Other/Food Service/Laboratory
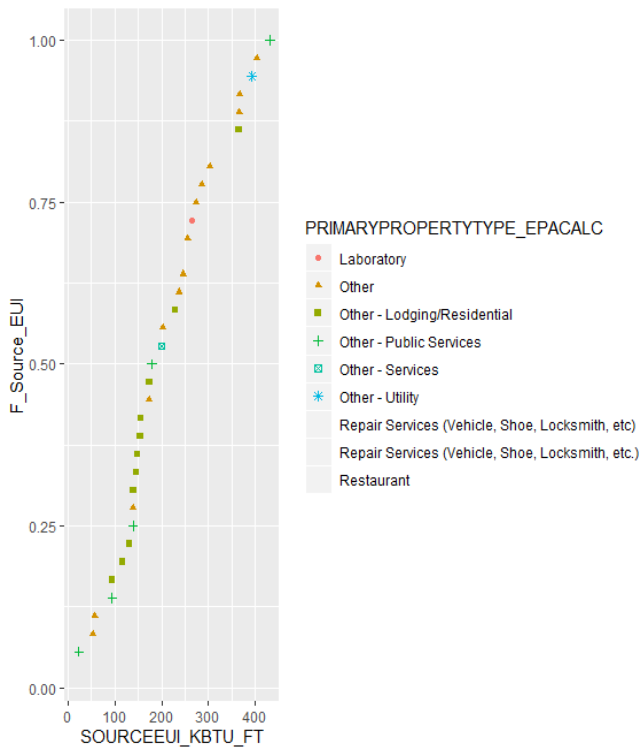
Public assembly/Education
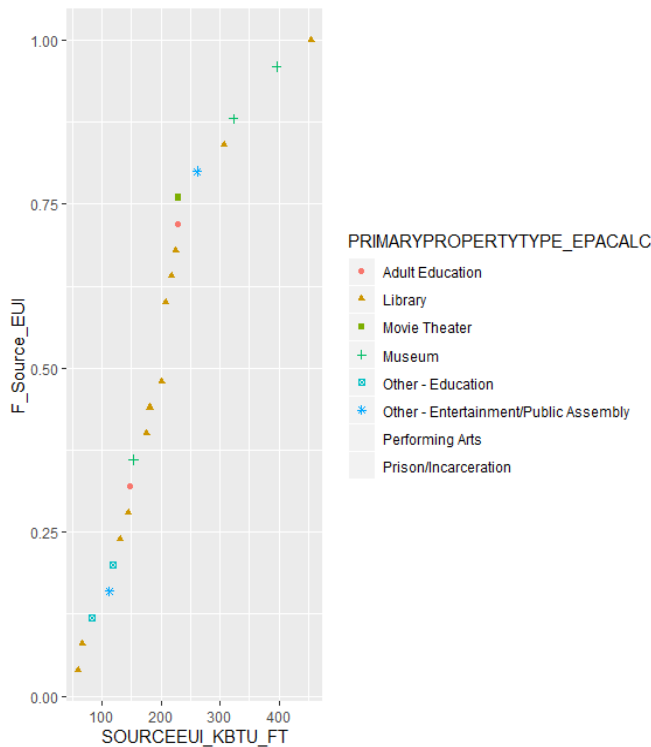
Fire Station/Police Station

National Median vs Custom Peer Groups

| NATIONAL MEDIAN GROUPS	CUSTOM PEER GROUPS
✓ National Representative peer group	✓ Statistically significant peer group based on District data
? Tied to EPA National Median for Equivalent Metric	✓ More control on Equivalent metric setting
✗ Might lead to small groups of properties frequently required to make improvements	? Larger combined property groupings based on EUI rather than just property type

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ADDITIONAL ANALYSIS AND COMMON QUESTIONS

Additional analysis was performed on common questions and whether or not these variable affect the energy star score or EUI

- Age of Property

- Size of Property

- Properties with different Use Details (i.e. Low-rise vs Mid/High Rise)

- Market Rate Housing vs Affordable Housing

SUBDIVISION BY BUILDING AGE

Benchmarking Data shows no statistically significant trend when examining Building Age to Source EUI. This means that the age of a building is not an indicator of whether or not a building will have a low or high EUI.

Age vs Source EUI

$y = 0.1991x - 240.64$
$R^2 = 0.0091$
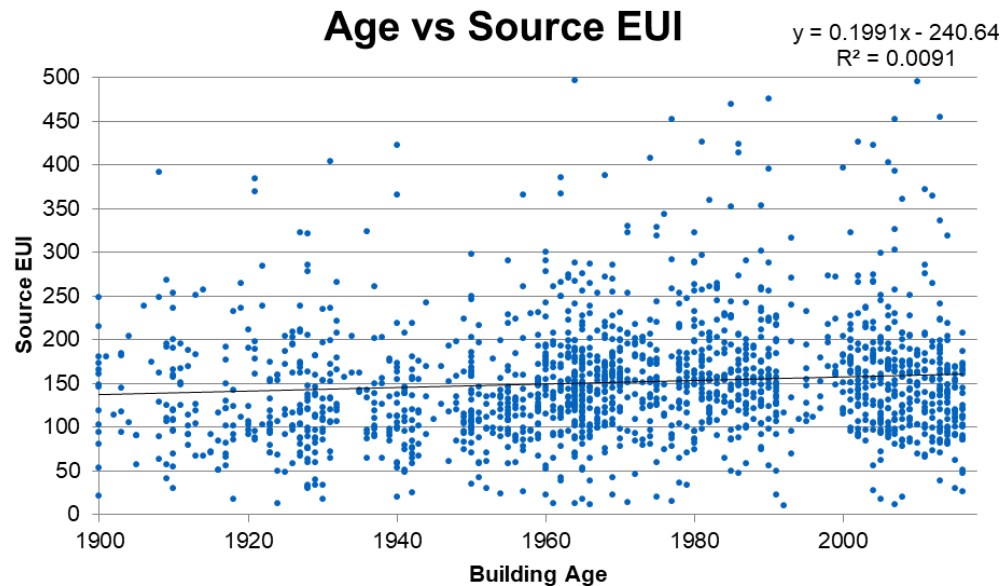
| Year Built	1900 - 1909	1910 - 1919	1920 - 1929	1930 - 1939	1940 - 1949	1950 - 1959	1960 - 1969	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2017
Count	43	62	124	76	85	149	294	153	209	82	234	170
Mean Source EUI	159.3	125.6	162.3	157.8	134.9	146.6	162.7	166.6	178.8	175.1	177.0	151.2
Median Source EUI	131.7	115.3	111.7	134.3	119.8	121.8	149.8	156.1	156.7	156.9	158.6	138.8

SUBDIVISION BY BUILDING AGE (cont.)

Benchmarking Data shows no statistically significant trend when examining Building Age to Energy Star Score. This means that the age of a building is not an indicator of whether or not a building will have a low or high score.

Age vs ENERGYSTAR SCORE

$y = 0.0147x + 30.132$
$R^2 = 0.0003$
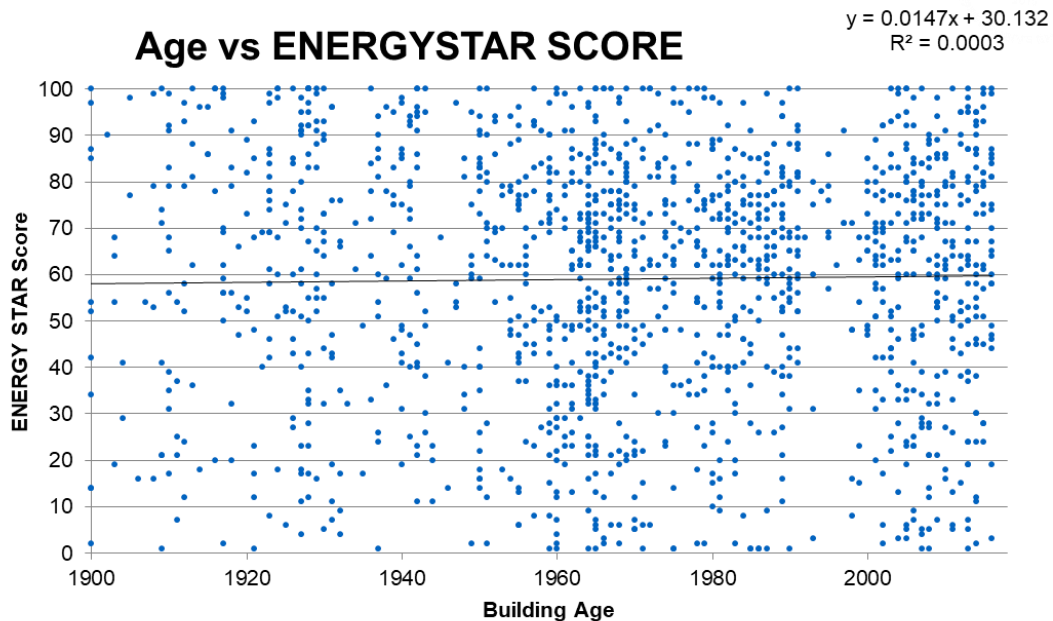
Year Built	1900 - 1909	1910 - 1919	1920 - 1929	1930 - 1939	1940 - 1949	1950 - 1959	1960 - 1969	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2017
Count	43	62	124	76	85	149	294	153	209	82	234	170
Mean ENERGY STAR SCORE	56	64	64	59	61	59	55	59	59	62	58	60
Median ENERGY STAR SCORE	54	65	69	64	61	64	59	63	64	66.5	64	64

# SUBDIVISION BY BUILDING SIZE

Benchmarking Data shows no statistically significant trend when examining Building Size compared to Source EUI. This means that the size of a building is not an indicator of whether or not a building will have a low or high EUI.

Gross Floor Area vs Source EUI

$y = 1E\text{-}06x + 151.3$
$R^2 = 8E\text{-}06$
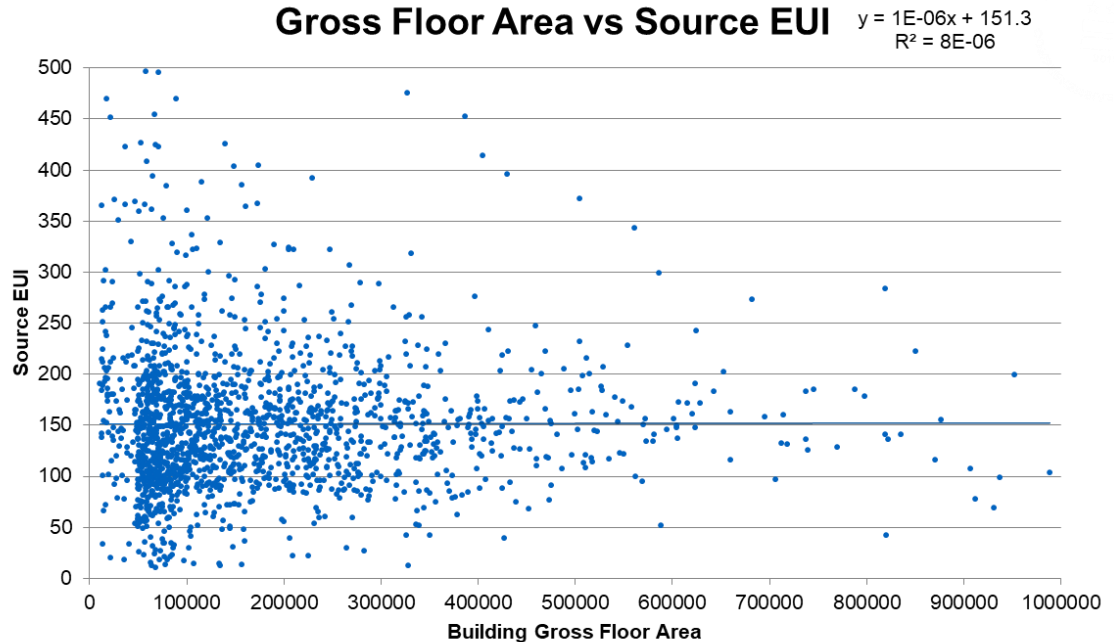
Square Footage Bin	50,000 - 74,999	75,000 - 99,999	100,000 - 149,999	150,00 - 199,999	200,000 - 249,999	250,000 - 299,999	300,000 +
Count	349	240	289	172	170	109	298
Mean Source EUI	165.0	152.7	152.1	163.0	153.9	152.3	169.0
Median Source EUI	129.8	134.6	143.6	153.5	143.3	148.6	150.3

SUBDIVISION BY BUILDING SIZE (cont.)

Benchmarking Data shows no statistically significant trend when examining Building Size compared to Energy Star Score. This means that the size of a building is not an indicator of whether or not a building will have a low or high score.

Gross Floor Area vs ENERGY STAR SCORE

$y = 3E\text{-}05x + 53.442$
$R^2 = 0.023$
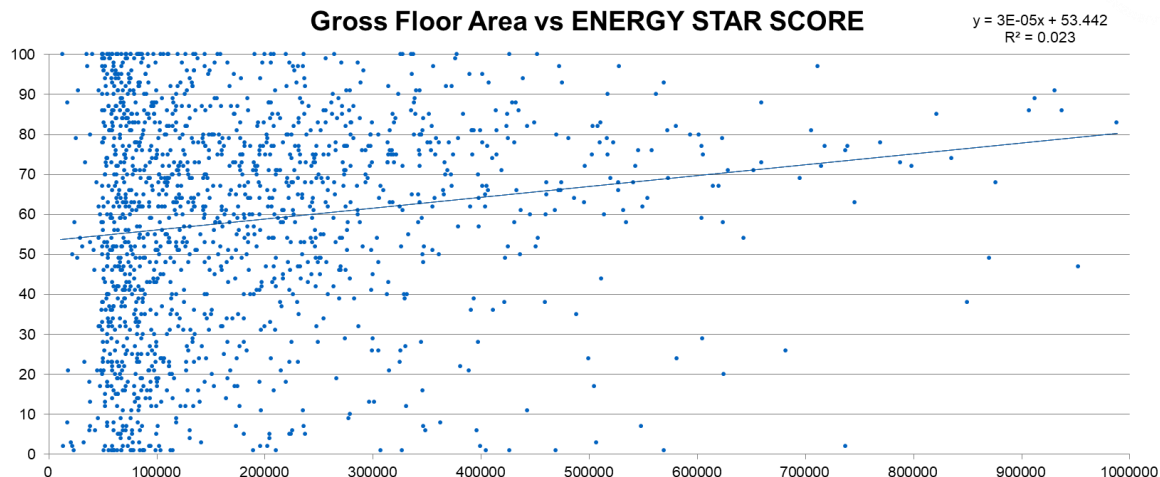
| Square Footage Bin	50,000 - 74,999	75,000 - 99,999	100,000 - 149,999	150,00 - 199,999	200,000 - 249,999	250,000 - 299,999	300,000 +
Count	349	240	289	172	170	109	298
Mean ENERGY STAR Score	56	55	56	59	61	66	65
Median ENERGY STAR Score	56	55	62	61	64	70	72

SUBDIVISION BY USE DETAILS

When examining EUI in the Mutli-family property type, Unit Density and Low-rise/Mid-rise/High-rise indicators in Portfolio Manager show a slight difference in Low-Rise Source EUI compared to ENERGY STAR SCORE.
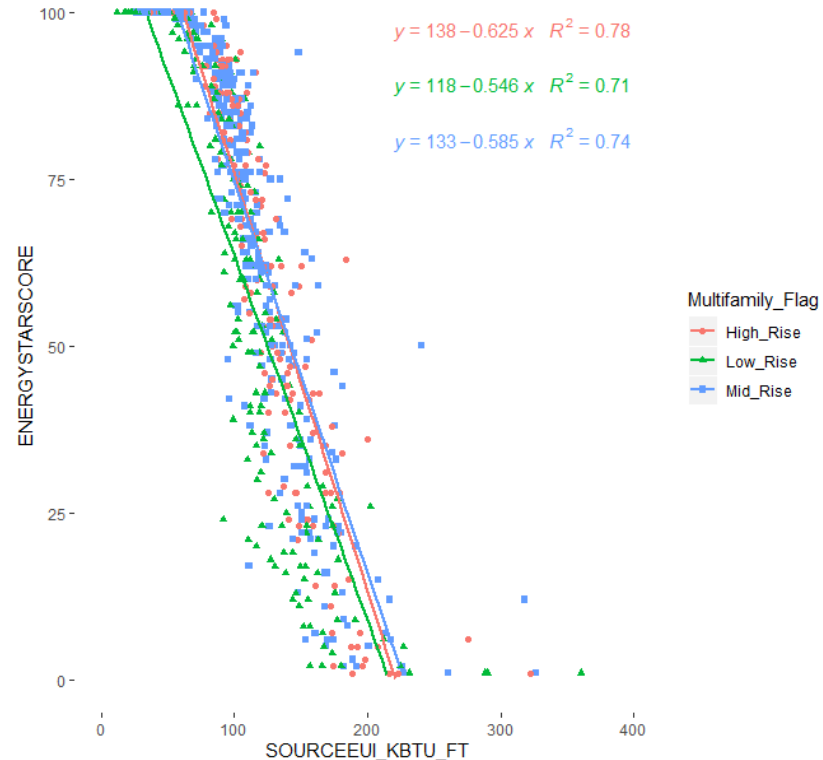
SUBDIVISION BY USE DETAILS (cont.)

Re-examining the same data through the Energy Star program, the multi-family Energy Star score corrects for apparent biases in Low-Rise Data behind the scenes.
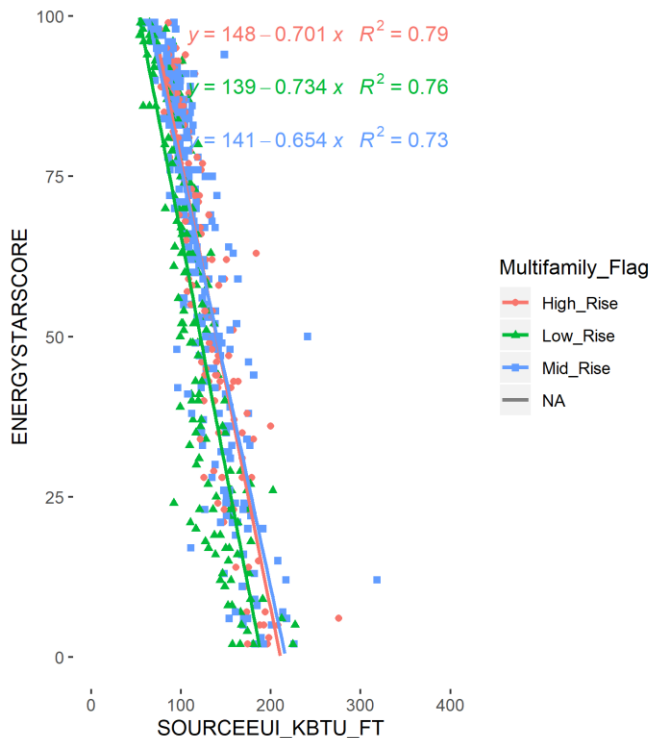
EQUIVALENT METRIC WG SCENARIOS

Section 301(b)(1)(A): No later than January 1, 2021, and every 5 years thereafter, DOEE shall establish property types and building energy performance standards for each property type, or an <u>equivalent metric for buildings that do not receive an ENERGY STAR score.</u>

<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Scenario 3</u>
DOEE will use **Weather-Normalized Source EUI** for buildings that cannot receive an ENERGY STAR Score.	DOEE will use **Greenhouse Gas Emission Intensity** for buildings that cannot receive an ENERGY STAR Score.	DOEE will use **Site EUI** for buildings that cannot receive an ENERGY STAR Score.

EQUIVALENT METRIC FEEDBACK FROM WORKING GROUP

- Generally, people preferred the first scenario of Weather Normalized Source EUI

- Concern about fairness for buildings who do get energy star scores

- Concern about incentivizing Natural Gas

- Local v. national metrics

- Whether or not RECs should affect metrics

METHODOLOGY FOR EQUIVALENT METRIC

- Evaluate energy performance for the whole building
- Reflect actual metered energy consumption
- Equitably account for different energy sources
- Normalize for building activity
- Provide a peer group comparison
- Does not provide adjustment for off-site renewables

In addition to these objectives, we added two that it is DC BEPS specific:

- Short term modeled BEPS savings from using equivalent metric is the same as modeled BEPS savings from the ENERGY STAR Score.
- Portfolio Manager can calculate the metric for any property with 12-months of calendar year utility data.

METRIC COMPARISON TO ENERGY STAR SCORE

Objectives of the ENERGY STAR Score	ENERGY STAR SCORE	Site EUI	Source EUI	Weather Normalized Source EUI	Green House Gas Intensity
Evaluate energy performance for the whole building	✓	✓	✓	✓	✓
Reflect actual metered energy consumption	✓	✓	✓	✓	✓
Equitably account for different energy sources	✓	✗	✓	✓	✓
Normalize for building activity	✓	✗	✗	✗	✗
Does not provide adjustment for off-site renewables	✓	✓	✓	✓	✗
All Building can receive metric	✗	✓	✓	✗	✓
Provide a peer group comparison	✓	✓	✓	✓	✓
Energy Savings (kBtu) - Tested using Multifamily Buildings	756,936,253	813,711,967	792,552,271	792,461,144	783,066,255

COMPARISON OF ALTERNATE HEATING SCENARIOS

Adapted from [EPA Portfolio Manager Technical Reference on Source Energy](#)
Energy Performance is more related to Heating System efficiency rather than Heating Fuel Type.
There is no bias towards Natural Gas when using the Source-Site Factors

	Building A	Building B	Building C	Building D	Building E	Building F
Heating Fuel	Natural Gas	Natural Gas	District Steam	Electric	Electric	Electric
Heating System	Gas-fired Boiler 90% combustion efficiency 80% system efficiency	District Steam 70% combustion efficiency 55% system efficiency	District Steam 95% system efficiency	Geothermal COP=4.0	Air Source Heat Pump COP = 2.5	Electric Resistance Heat
Heat to Space (MBtu)	1000	1000	1000	1000	1000	1000
Site Energy (MBtu)	1250	1818	1053	250	400	1000
Source Energy (MBtu)	1313	1909	1264	700	1120	2800

Note that the U.S. source-site ratios were applied:
- Electricity: 1 unit site = 2.80 units source
- Natural Gas: 1 unit site = 1.05 units source
- Steam: 1 unit site = 1.20 units source

NEXT TASK FORCE MEETING

January 21 – Performance Path, Other Pathways

- Are there any property type breakdowns the group would like to evaluate? (i.e. affordable housing).

- Should we look into how to adjust for non-compliant buildings? (Need to look at compliance rates by building type)

- What alternative Compliance Scenarios would you like us to test?
    - Target Median?
    - Reduce Gap?

ANNOUNCEMENTS