



WPI

Building Energy Benchmarking

City of Alexandria

Northern Virginia Regional Commission

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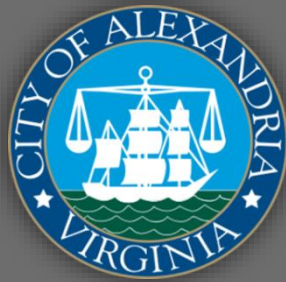


Overview

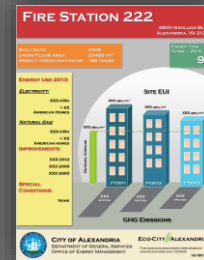


WPI

WPI Project



Benchmarking



Labeling



Summary

Worcester Polytechnic Institute

GREAT
MINDS



MULTIPLIED



22,000
students

3,600
projects

500
global partners

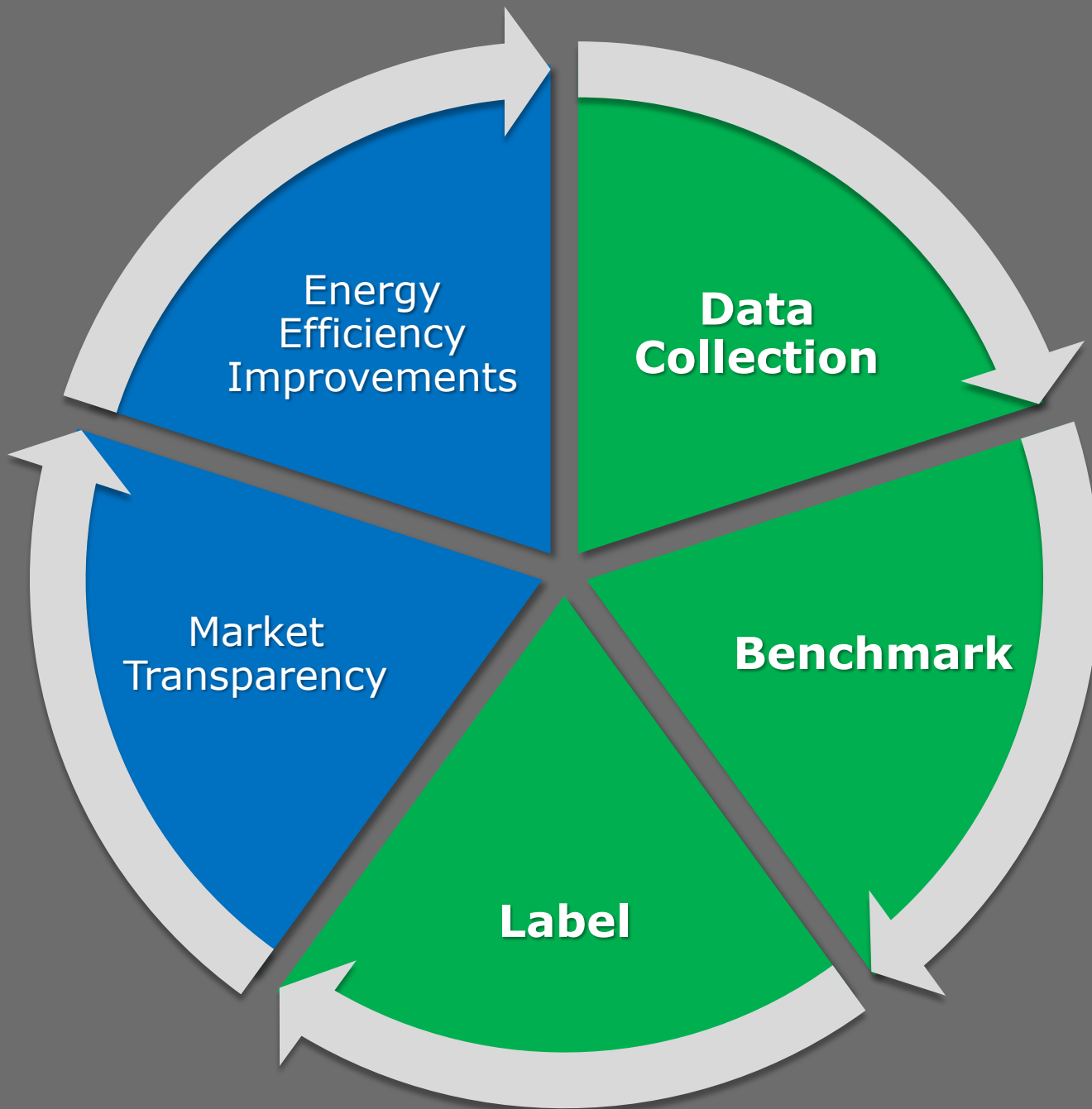
40
years applied learning

39
centers worldwide

1 LANDMARK
EDUCATION

Building Energy Benchmarking & Labeling

1. Government building benchmarking in Alexandria
2. Government building benchmarking and labeling plan for NoVA
3. Voluntary commercial building energy benchmarking & labeling program for NoVA



Alexandria Benchmarking

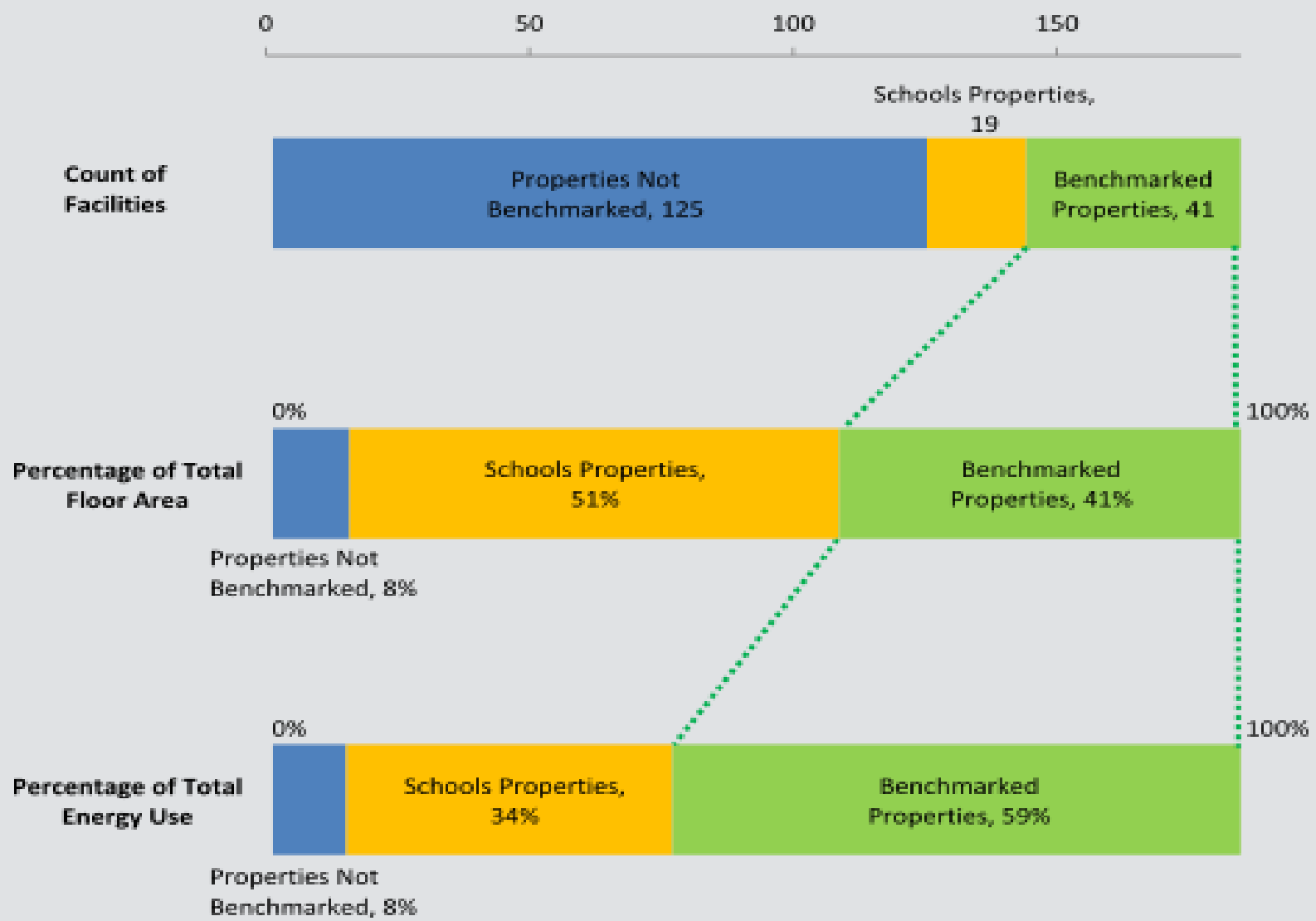
Building Selection

- Buildings $> 5,000 \text{ ft}^2$
- Accessible property data
- Minimum of 12 month utility data
 - Ideal 24 months utility data

Data Collection

- Rich data set
- Multiple forms
- Verifying accuracy
- Assumptions for missing data
- Time consuming

Scope of Benchmark



Additional Building Features

- Built Dates: 1773 – 2011
 - Most constructed in 1980s
 - Brick and masonry constructions
 - Small steel frame %
- Energy resources
 - Primary electric (60%)
 - Secondary natural gas (40%)



Benchmarking Analysis

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ENERGY STAR® PortfolioManager®

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Alexandria City Hall (with Market Square Garage)

301 King Street, Alexandria, VA 22314 | [Map It](#)

Portfolio Manager Property ID: 3894791 | Primarily: [Office](#)

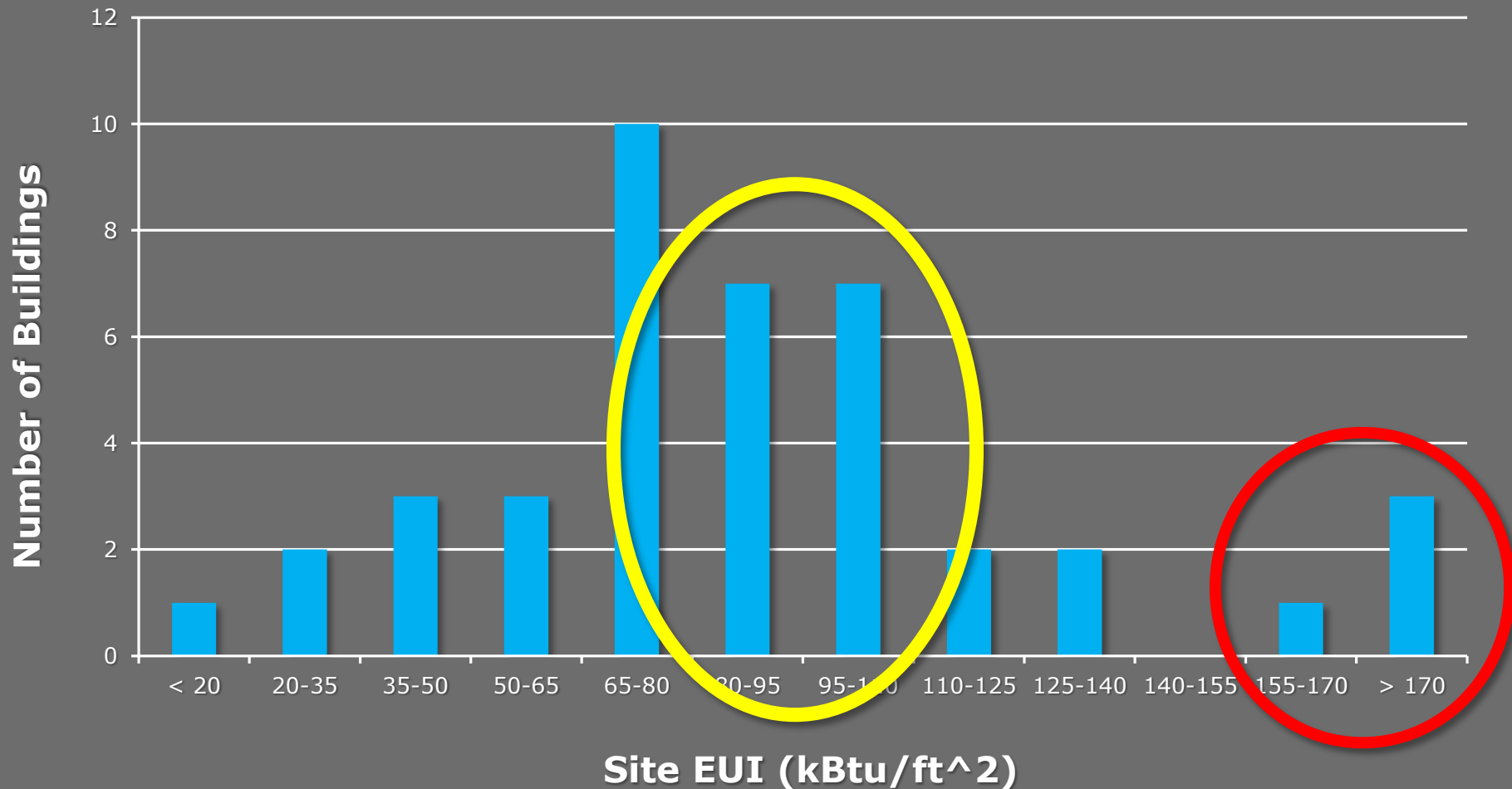
Year Built: 1875

[Apply for ENERGY STAR Certification](#)

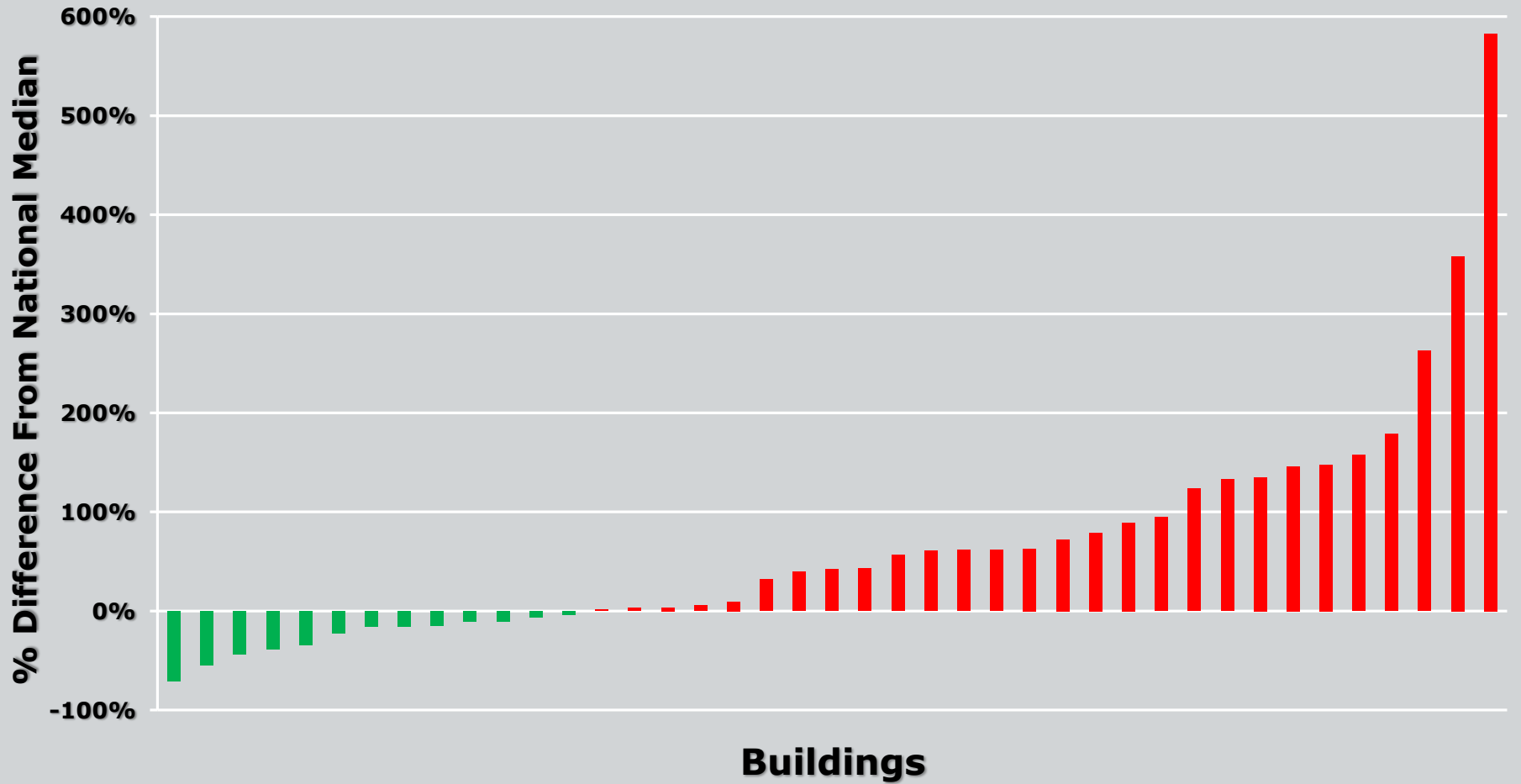
ENERGY STAR Score (1-100)
Current Score: 81
Baseline Score: 70

- Energy Use Intensity (EUI)
- ENERGY STAR Score

Distribution of Site EUI



National Comparisons



Comprehensive Results

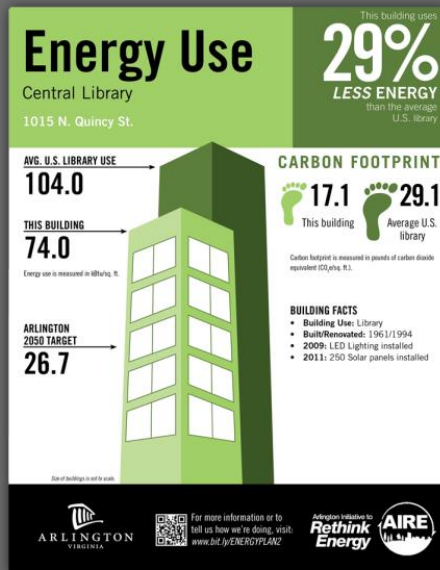
Property Name	Fiscal Year 2013						
	Total Site Energy Use (MM Btu)	Site EUI (k Btu/ft ²)	Comparison to National Median	Site EUI by Energy Resource (k Btu/ft ²)	Monthly Site EUI (k Btu/ft ²)	Change FY2013 vs. FY2012 (%)	Carbon Footprint (lb-Co ₂ /ft ²)
RPCA - Alexandria Average		142.9					2.6
		92.2					1.9
		281.4					4.5
		66.3					1.4
		11.9					0.2
		101.4					2.0
		66.7					1.4
		70.9					1.7
		36.7					0.7
		106.2					2.2
		102.0					2.6

NoVA Government Building Energy Benchmarking

- Measure buildings' energy performance
- Communicate to the public
- Provide the information to building managers to improve building performance
- Help build a regional building performance database (VEPGA, MWCOG)



NoVA Government Building Energy Labeling



- Represents the building's energy performance
- Shows energy performance trend
- Easy to understand
- Visually appealing



Energy Performance Label

FIRE STATION 222

2800 HIGHLAND BLVD.
ALEXANDRIA, VA 21212

BUILT DATE: 2008
GROSS FLOOR AREA: 23456 FT²
WEEKLY OPERATING HOURS: 168 HOURS

ENERGY STAR
SCORE – 2013:

91

ENERGY USE 2013:

ELECTRICITY:

XXX kBTU
= XX
U.S. HOUSEHOLDS

NATURAL GAS:

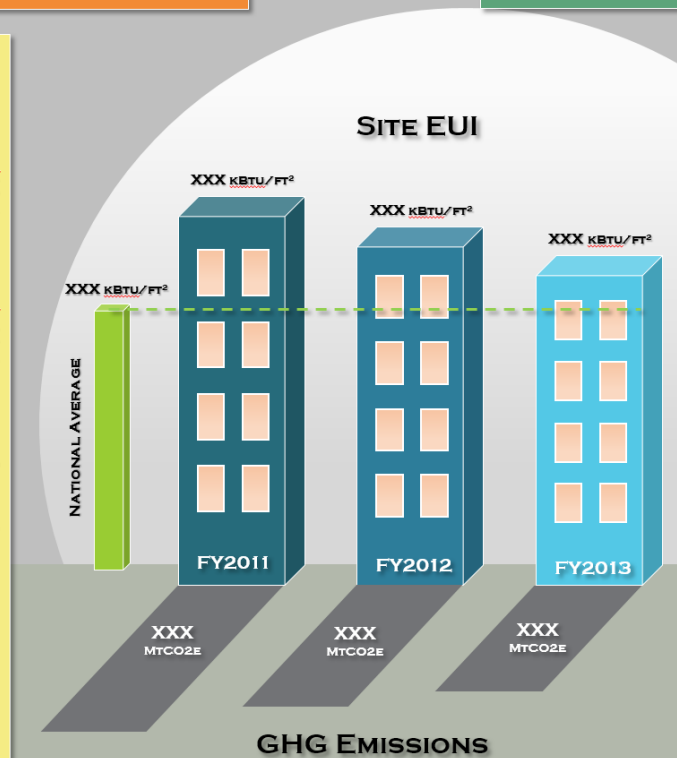
XXX kBTU
= XX
U.S. HOUSEHOLDS

IMPROVEMENTS:

XXX 2012
XXX 2009
XXX 2005

SPECIAL CONDITIONS:

NONE



CITY OF ALEXANDRIA
DEPARTMENT OF GENERAL SERVICES
OFFICE OF ENERGY MANAGEMENT



Eco-CITY ALEXANDRIA

SCAN THE QR CODE FOR MORE INFORMATION AT:
[HTTP://WWW.ALEXANDRIAVA.GOV/Eco-City](http://www.ALEXANDRIAVA.gov/Eco-City)

12/2013

The building's Name and address.

FIRE STATION 222

2800 HIGHLAND BLVD.
ALEXANDRIA, VA 21212

BUILT DATE: 2008
GROSS FLOOR AREA: 23456 FT²
WEEKLY OPERATING HOURS: 168 HOURS

ENERGY STAR
SCORE – 2013:
91

The building's ENERGY STAR score rated by Portfolio Manager if applicable.

The basic building characteristics and use properties.

ENERGY USE 2013:

ELECTRICITY:

XXX kBtu
= XX
U.S. HOUSEHOLDS

NATURAL GAS:

XXX kBtu
= XX
U.S. HOUSEHOLDS

IMPROVEMENTS:

XXX 2012
XXX 2009
XXX 2005

SPECIAL CONDITIONS:

NONE

ENERGY USE:

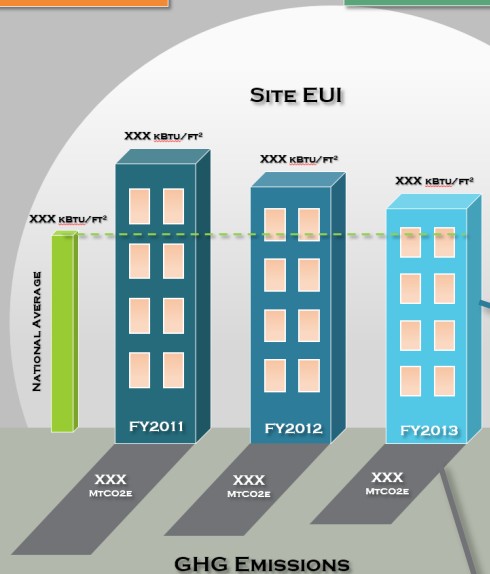
The building's most current energy use information including both electricity and natural gas usage with equivalence to a number of average U.S households.

IMPROVEMENTS:

The past or undergoing energy efficiency improvements.

SPECIAL CONDITIONS:

The building's uniqueness, e.g. a building entirely powered by electricity.



SITE – EUI:

The building's annual EUI (Energy Use Intensity, measured in kBtu/ft²) performance trend during the most recent 3 fiscal years. The building height is linearly related to the building's annual EUI performance.

NATIONAL AVERAGE:

The national/regional average site EUI performance for similar type buildings. The green line represents the baseline for these averages.



CITY OF ALEXANDRIA
DEPARTMENT OF GENERAL SERVICES
OFFICE OF ENERGY MANAGEMENT



ECO-CITY ALEXANDRIA
SCAN THE QR CODE FOR MORE INFORMATION AT:
[HTTP://WWW.ALEXANDRIAVA.gov/Eco-City](http://www.ALEXANDRIAVA.gov/Eco-City)
12/2013

LEFT:

The jurisdiction's information with logo and building benchmark team's information.

RIGHT:

The jurisdiction's local energy program if applicable, reference link with QR code for more information, and the time the label was produced.

The building's annual GHG (Green House Gas, measured in MtCO2e) Emissions trend for the most recent 3 fiscal years. The shadow height of the building is linearly related to the building's resulting GHG Emissions..

Voluntary Benchmarking Program for Commercial Buildings

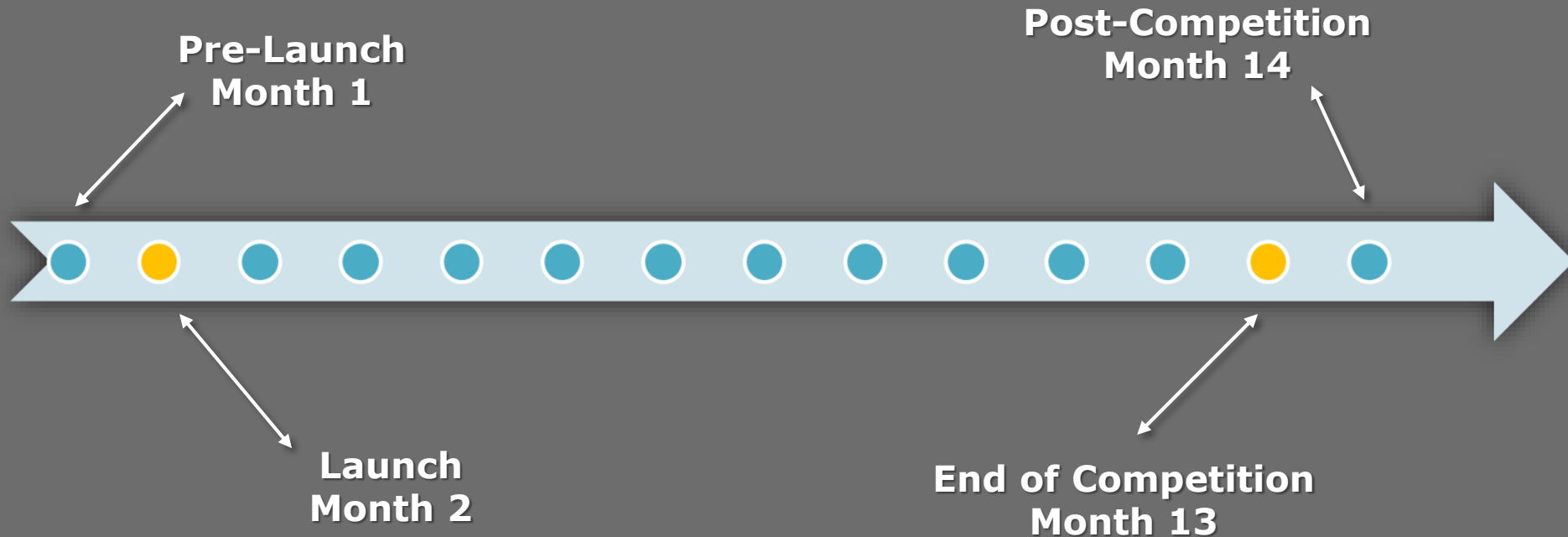
- Purpose
 - Promote energy efficiency investment in commercial buildings
 - Increase energy and cost saving opportunities
 - Increase market transparency and public awareness
- National Leaders
 - Washington, DC
 - New York City
 - Philadelphia
 - Chicago

Using Lessons from *Arlington Green Game*



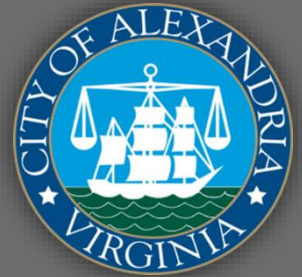
- Voluntary Program
- Policy and Target Audience
- Technology Infrastructures
- Partner Organizations

Benchmarking Competition Timeline



Summary

- Benchmarking in Alexandria
- Northern Virginia Benchmarking & Labeling Plan
- Northern Virginia Voluntary Benchmarking Program
- Position Alexandria and Northern Virginia jurisdictions as leaders in promoting energy efficiency
- And ultimately, reducing Alexandria's, Northern Virginia's, and Metropolitan Washington DC's greenhouse gas emissions



Acknowledgements

- **Institute for Market Transformation**
 - Andrew Burr, Director of Building Energy Performance Policy
- **Arlington County**
 - John Morrill, Energy Manager
 - Jeannine Altavilla, Energy Program Analyst
 - Kelly Zonderwyk, Energy Program Specialist, AIRE
- **NVRC**
 - Stephen Walz, Director of Regional Energy Planning
- **City of Alexandria**
 - Bill Eger, Energy Manager

Questions

