

# Government Building Energy Performance Benchmarking and Labeling Protocols

## Government Building Energy Benchmarking and Labeling

- Benchmarking
  - Background
  - Process Management
  - Building Selection
  - Data Collection
  - Data Verification
  - Portfolio Manager
  - Benchmark Results
  - Energy Performance Labels
  - Regional Database
- Labeling
  - Purpose
  - What to show
  - Model label
- Future Actions

## *A Guidebook for Building Energy Benchmarking*

*Energy use in buildings comprises about 40% of primary energy consumption in the United States. Improving buildings' energy efficiency is an effective way to save energy, reduce resulting emissions, and cut energy cost. However, building managers may not be aware of the level of savings that are available. A building benchmarking and labeling program will increase transparency and improve building operator and public awareness of public buildings.*

*This Guidebook describes an energy benchmarking and labeling program that local governments can use to lead by example and serve as a basis for a commercial building benchmarking and labeling effort.*

February, 2014

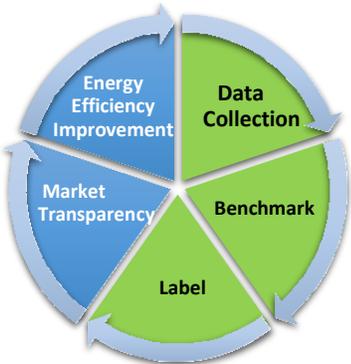
## **A Report on Accelerating Commercial Building Energy Retrofits**



**Executive Summary**

Energy use in buildings comprises about 40% of primary energy consumption in the United States. Improving buildings’ energy efficiency is an effective way to save energy, reduce resulting emissions, and cut energy cost. However, building managers may not be aware of the level of savings that are available. A building benchmarking and labeling program will increase transparency and improve building operator and public awareness of public buildings.

There are five primary steps to a building energy efficiency process. Benchmarking and labeling are key step in an energy efficiency improvement process by providing the base line information about the local government’s buildings as well as provide a metric for measuring progress in the local energy program.



This protocol document provides best-practice guidance about implementing a government building energy benchmarking and labeling program - how to apply energy benchmarking specifically to their government buildings.

The document includes background on benchmarking, and lays out the process to select buildings to be benchmarked, gather and verify needed data, benchmark using the ENERGY STAR Portfolio Manager tool, prepare a municipal benchmark report, and develop building energy performance labeling to communicate benchmark results to building users and the public.

*This Report was prepared in part with funding provided by the U.S. Department of Energy, DE-EE0005460, “Accelerating Commercial Building Retrofits: Policy, Best Practice Compilation, Pilot Implementation.”*



## **1.0 Government Building Benchmarking**

### **1.1 Background**

The plan is designed for energy benchmark of existing government buildings.

The plan focuses on the buildings' energy performance benchmarking, not on asset benchmarking. Performance benchmarking measures how a building is performing, whereas asset benchmarking measures how a building is designed.

Water and sewer performance benchmarking are not included; however, they can be benchmarked using similar methods.

This plan uses the EPA's ENERGY STAR Portfolio Manager Tool to benchmark energy performance.<sup>1</sup>

### **1.2 Building benchmark management**

The first step to a successful benchmarking program is to assign a building benchmark team with access to jurisdiction's utility data and building information, knowledge on energy, and the ability to communicate across different government departments. Ideally, this team should be led by the jurisdiction's energy or facility manager.

### **1.3 Select buildings to benchmark**

Not all buildings need to be benchmarked. Some do not consume energy, while others are so small as to be de minimis when measured across the local government enterprise. Therefore, the jurisdiction's building benchmarking team should use the following criteria to select buildings to conduct benchmarking analysis:

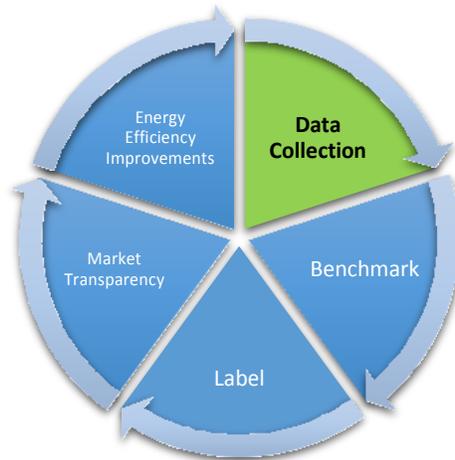
1. Buildings with gross floor area greater than 5,000 ft<sup>2</sup>.
2. Buildings upon which the team can gather the information needed to define the buildings' characteristics, such as its name, address, gross floor area, year built, etc.
3. Buildings for which you can collect at minimum 12 consecutive calendar months of energy/utility usage data.

### **1.4 Data Collection**

Data collection can be challenging depending on the amount readily available. This section covers methods for the building benchmarking team to collect and organize the required data.

---

<sup>1</sup> Most of NVRC's member jurisdictions are using EPA's ENERGY STAR Portfolio Manager for energy management. For those haven't been using Portfolio Manager, it is free to register and use through [EPA ENERGY STAR Portfolio Manager Website](#).



There are a number of tools that can be used to collect and manage buildings' utility and property data. They include:

#### Free Platforms:

- ❓ **ENERGY STAR Portfolio Manager** is a free online platform for building energy management developed by the Department of Energy.
- ❓ **Microsoft Excel** provides the ability to manually create spreadsheets to input and maintain data. You can generate simple analysis and reports using Excel.

#### Commercial Platforms:

- ❓ **EnergyCAP** is a utility bill and energy efficiency software for businesses, governments, and educational institutions. EnergyCAP integrates with ENERGY STAR Portfolio Manager by exporting utility data for benchmarked buildings and import performance measures.
- ❓ **Aquicore** is a web based software for utility analysis and energy savings. It provides various solutions including energy benchmarking, reporting for both government and private buildings.
- ❓ **JouleX Energy Management (JEM)** offers energy management solutions for data centers, distributed offices, and PCs.

EPA's ENERGY STAR Portfolio Manager is recommended for building benchmarking as it is widely used, allows for comparison with buildings across the National Capital Region and Commonwealth through the MWCOG and VEPGA user groups.

#### 1.4.1 Collect buildings' utility data

- **Contact the jurisdiction's energy management, facilities, and financial offices**

Contact the jurisdictions' energy manager, facilities manager, or financial officer since they typically manage and pay the bills for government buildings' energy use.

- **Contact utility companies**

Electricity and natural gas usage data may be available from the jurisdiction's utility companies. Contact the jurisdiction's electricity and natural gas utility companies to inquire about obtaining usage data for buildings that are subject to benchmarking.

This may require you to provide account numbers to the utilities as they may not be able to identify all accounts belonging to a locality.

- **Contact management of leased buildings**

If the locality leases space, contact the buildings' private property managers to acquire utility data. The locality may only lease a part of the building, thus requiring the building manager to separate utility data of the agency's office with other businesses in the building. This can be done on a per-square foot basis if all uses in the building are similar. If there are dis-similar uses in the building proration may need to be made based on factors such as hours of use, building modeling, or other factors.

- **Calculate energy use data for fuels purchased and delivered in bulk**

Calculate energy use by allocating energy use over the time between deliveries for bulk fuels such as propane and diesel. This allocation is typically calculated based on heating degree days for heating fuel, hours of operation for equipment such as backup generators, or by calendar days for hot water or other regular uses.

- **Energy Audit**

If available, energy audit can be a good source of data.

Collecting utility data takes time but relatively easy to accomplish since buildings' utility data are typically monitored, and stored by both energy providers and government facility or fiscal managers.

### 1.4.2 Collect building property data

Collecting building property data is often the most difficult data collection task. The data is rarely located in one place, so requires coordinating input from multiple parties. This information is essential for ENERGY STAR Portfolio Manager to perform benchmarking and rating. The table below outlines required building property data for most property types relevant benchmarking of NVRC member jurisdictions.

	Building Data	Definition
Basic Information	Name	Name of the building
	Address	Street address of the building
	Postal Code	Zip code of the building
	Year Built	Year the building was first built
	Number of Buildings	Part of a building/one building/multiple buildings
	Occupancy Level	Percentage of the occupancy level
Property Use Details	Type(s)	Type(s) of the building <sup>2</sup>
	Gross Floor Area	Total floor area in squared feet or squared meters
	Weekly Operating Hours	Weekly operating hours of the building
	Number of Computers	Total number of computers in use of the building
	Number of workers on main shift	Number of workers/staffs on main shift in the building
	Percent Cooled	Percentage of gross floor area that can be cooled
	Percent Heated	Percentage of gross floor area that can be heated

Building property use details may vary depending upon building type. For more information about what property use details data are needed, refer to the Energy STAR Portfolio Manager guidance at [Identify your property type](#).

### 1.4.3 Define buildings' into single or multiple property type(s)

Portfolio Manager provides for more than 80 property types. Additionally, Portfolio Manager can provide an Energy STAR score for 20 of the property types. Each property type has differing space and energy use characteristics. You should select the type that best matches the building being benchmarked. Additional direction for selecting your property type follows.

For more information on the Portfolio Manager property types, refer to appendix I or the Portfolio Manager web site at [Identify your property type](#) and [Property types eligible to receive a 1-100 ENERGY STAR score](#).<sup>3</sup>

<sup>2</sup> For more information of field "Type(s)" highlighted in blue, refer to following section 1.4.3.

<sup>3</sup> For clarification, this plan unifies the terms: "primary function", "type of use", and "property type" into "property type". Portfolio Manager web-based software uses "primary function" and "type of use" while its

official documentation uses “property type”.

**1. EUI Only Benchmark (Preferred)**

Due to the limited set of property types for which Energy STAR scores are available, it is recommended that buildings be benchmarked using the EUI (Energy Use Intensity) method. Use of the EUI also facilitates entry of buildings into the two regional ENERGY STAR Portfolio Manager Master Accounts available through the Virginia Energy Purchasing Government Association (VEPGA) and Metropolitan Washington Council of Governments (MWCOG).

**2. For all buildings to receive ENERGY STAR scores (Optional)<sup>4</sup>**

This method allows the building benchmark team to categorize property types into the 20 types for which an Energy STAR score is available. This facilitates comparison of a building’s energy performances with similar building]gs nationwide. [Bill please look at this to be sure it accurately describes how to characterize a multi-use building.]

EUI Only	EUI + ENERGY STAR Score
<p>Define building functions using one of the 80 Portfolio Manager functions available.</p>	<p>Characterizing a building type into the 20 Energy STAR functions is done through classifying the building as the Energy STAR function that best matches the predominate function of the property. If the property use does not exactly match the Energy STAR function, then the team must characterize the building function to the Energy STAR function through developing a normalization factor. For example, .....</p>
<p>E.g. A fire station should be defined as a “fire station”.</p>	<p>E.g. A fire station can be defined as “office” or and “non-refrigerated warehouse” depending on the predominate use of the fire house.</p>

**Three examples:**

**1. Single type buildings**

Single-function buildings are easy to define in Portfolio Manager. For example, office buildings are defined as “office” for its space use.

**2. Multiple type buildings<sup>5</sup>**

<sup>4</sup> For more information of eligibility of getting an energy performance score, see [Eligibility criteria for the 1-100](#)

[ENERGY STAR score.](#)

<sup>5</sup> For more information of defining space types, refer to: [Identify your property type](#) and [List of Portfolio Manager property types, definitions, and use details.](#)

Multiple use buildings are common. For instance, an office building may have a data center, a library could be used as library and office, or a school might house a community center. Portfolio Manager defines different property types each with its own property details. An example of how to characterize a multi-use building is shown below. [Bill – Can we use a specific example here, possibly by generalizing one of the City building examples.]

Building Data		Definition
Property Use Details	<b>Type 1</b>	<b>Type of this space</b>
	Gross Floor Area	Total floor area in ft <sup>2</sup> /m <sup>2</sup> of this function space
	Weekly Operating Hours	Weekly operating hours of this function space
	Number of Computers	Total number of computers in use of this function space
	Number of workers on main shift	Number of workers/staffs on main shift in this function space
	Percent That Can Be Cooled	Percentage of floor area that can be cooled
	Percent That Can Be Heated	Percentage of floor area that can be heated
	<b>Type 2</b>	<b>Type of this space</b>
	Gross Floor Area	Total floor area in ft <sup>2</sup> /m <sup>2</sup> of this function space
	Weekly Operating Hours	Weekly operating hours of this function space
	Number of Computers	Total number of computers in use of this function space
	Number of workers on main shift	Number of workers/staffs on main shift in this function space
	Percent That Can Be Cooled	Percentage of floor area that can be cooled
	Percent That Can Be Heated	Percentage of floor area that can be heated
	<b>Type 3</b>	<b>Type of this space</b>
:	:	

### 3. Buildings with non-governmental uses

Some buildings may be partially occupied by government and partially occupied by private users. In these cases, the building benchmark team should contact building manager to extract the utility and property data for government space uses. The energy data should be prorated by an applicable factor such as per square foot, per occupant, per hours of occupancy, or other factor. It is critical to select a proration methodology appropriate for the types of uses in the building.

## 1.5 Verify data quality

The benchmarking team must use reliable data to produce reliable performance benchmarking and ratings. The following methods provide a process for the building benchmark team to verify integrity and reliability of building utility and property data.

### 1.5.1 Site Visits

Site visits to a building are needed to document conditions such as building type, space uses, operating hours, and special uses through field investigations.

### 1.5.2 Communication within jurisdiction government

The benchmarking team should communicate with department managers operating their buildings. This communication is typically the best way to verify operating hours, number of PCs (where applicable), number of occupants, etc.

## 1.6 Input data into Portfolio Manager<sup>6</sup>

After all the needed data are collected, the building benchmark team should input data into Portfolio Manager.<sup>7</sup> Data is input through three steps as shown below.



## 1.7 Test Run Portfolio Manager benchmarking system

Once building utility and property data are entered and saved in Portfolio Manager, the benchmark results can be automatically be calculated:

EUI Only	EUI + ENERGY STAR Score
Every building should have its EUI performance results.	Every re-characterized building should receive its 1-100 Score, together with its EUI performance results.

<sup>6</sup> For more information of how to add a property/building and input utility and property data into Portfolio Manager, see: [Get started with the benchmarking starter kit](#) and [Enter data into Portfolio Manager](#).

<sup>7</sup> For those jurisdictions using Portfolio Manager to collect data, verify the data inputted is recommended.

## **1.8 Verify data quality using Portfolio Manager**

### **1.8.1 Data Quality Checker<sup>8</sup>**

The built-in Data Quality Check function of Portfolio Manager is designed to check for errors and anomalies after the data are inputted. The building benchmark team can run a simple report to compare the building's data with typical values. This helps identify energy values and property use details that are unusual given the building's uses. It also helps identify possible typos, incorrect meter readings, missing information, incorrect units of measure, and other common data entry problems. Any atypical data should be investigated to confirm its accuracy or for correction.

### **1.8.2 Sensitivity Analysis**

For multi-type buildings, the building team should assess the quality of the building's normalized property type by changing key building's property use details that were estimated during the normalization process. If changing some property use detail effects the score significantly, the team should develop a more precise normalization. For instance, if changing the number of computers and number of workers on main shift significantly changes the Energy STAR score, then the model may be disproportionately weighing these factors under the property type chosen.

---

<sup>8</sup> For more information of using Data Quality Checker, see: [Verify your information with the data quality checker.](#)

## **1.9 Produce EPLs for benchmarked buildings**

### **1.9.1 Generate building energy benchmark reports with analysis<sup>10</sup>**

The building benchmark team should produce a report that shows the government-wide benchmarking results. This report can also identify target buildings that should be investigated for energy efficiency improvements. This report is ought to be updated annually based on a yearly benchmark process.

A building energy benchmark report with analysis should contain:

- ❑ List benchmarked buildings and buildings not selected for benchmarking, Include the rational for selecting buildings and information on the percentage of the locality's buildings benchmarked.
- ❑ Total energy consumption for the locality
- ❑ An analysis of the distribution of EUI and Energy STAR scores
- ❑ Energy usage analysis broken out by different property types
- ❑ Energy use trend analysis, preferably for at least three years
- ❑ Comparison of EUI among different buildings
- ❑ Recognition of top energy efficacy performing buildings
- ❑ Targets for improvements

---

<sup>9</sup> For more information of how the 1 – 100 ENERGY STAR score is calculated, see [ENERGY STAR score details by property type](#) and [ENERGY STAR® Performance Ratings Technical Methodology](#).

<sup>10</sup> A report example: City of Alexandria’s 2013 Energy Benchmark Report.

### **1.12 Use a regional building energy database**

In addition to benchmarking and labeling government buildings, it is recommended that the locality enter its building data into an ENERGY STAR Portfolio Manager Master Accounts. This allows the locality to compare its buildings to data in a regional Portfolio Manager Government Building Database. This will provide a broader database to compare building performance against and allow the team to better identify target buildings for future energy efficiency improvements.

A master account is a designated Portfolio Manager account with which multiple Portfolio Manager users can share building and energy use information. There are two regional Portfolio Manager Master Account available for use by northern Virginia jurisdictions.

- ❓ Virginia Energy Purchasing Governmental Association (VEPGA)<sup>11</sup>

Sharing with the VEPGA Master Account allows comparison with other public buildings in the Dominion Virginia Power’s service territory. This also facilitates construction of a larger data set for buildings in which a single locality would not have a sufficient number for comparison. For example, no single locality has sufficient numbers of animal shelters, community centers, fire stations, or other special use facilities to populate a large database.

- ❓ Metropolitan Washington Council of Governments (MWCOG)

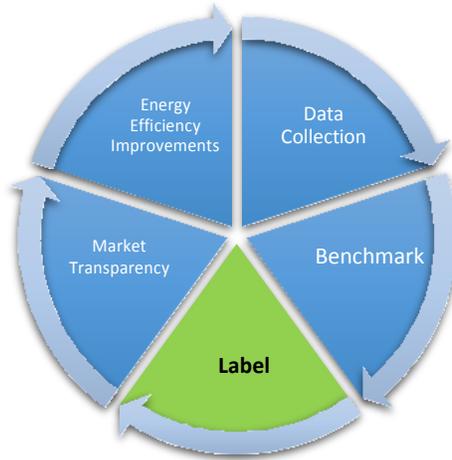
[Add description]

---

<sup>11</sup> For joining the VEPGA Master Account, refer to [Share Energy Performance Data with the VEPGA Master Account](#).

## 2.0 Building Energy Performance Label for Northern Virginia

After benchmarking buildings, the team can produce web-based reporting and an Energy Performance Label (EPL) for public display.



### 2.1 Purpose and expectation of the EPL

Energy performance labels can increase transparency of government buildings' energy performance to building users and the public. This serves as a tool to educate building users about the energy efficiency of their building and set the stage for communication about how their actions can affect the building's energy rating. It also serves as a method to inform local citizenry about how efficient (or not) the locality is using its resources.

An energy performance label should be displayed in the entrance or other highly-visible areas of a building's for public display. Additionally, jurisdictions may consider displaying EPLs in areas accessible to building managers and employees to promote energy reduction activities.

EPLs should be designed considering the following requirements:

- Clearly represents the building's energy performance
- Show the building's energy performance trend
- Be easy for audience to understand
- Be visually appealing

## 2.2 Information to display

A label should display:

- Basic facility data including the building name and address, built date, gross floor area, weekly operating hours, and energy performance score – either the EUI, Energy STAR score, or both.
- EUI performance and trend, recommended on a three-year basis.
- Comparison with national/regional averages for that building type.
- GHG emissions trend for the three-year period covered by the label.
- Energy use equivalences<sup>12</sup> in understandable terms such as the equivalent number of typical U.S. households that would use the amount of energy used by the facility.
- Past or ongoing energy efficiency improvements that have affected the facility’s energy ratings.
- The jurisdiction’s name and reference link or QR code.

## 2.3 Label graphic prototype – Start Again Here

The following example EPL shows recommended information and graphic design elements. It is meant as a first level markup of an energy performance label. Governments should work together to develop a uniform building use label for use across jurisdictions.

<sup>12</sup> For information of equivalences to a number of U.S. Households, use the data available at [EIA’s AEO Table browser](#)

to calculate. Notice always use the most current year’s information to calculate.

Formula:

$$EUI = \frac{\text{The building's Annual Electricity use (kWh)}}{\text{Total Households}}$$

$$NGUEI = \frac{\text{The building's Annual Natural Gas use (therms)}}{\text{Total Households}}$$

# FIRE STATION 222

2800 HIGHLAND BLVD.  
ALEXANDRIA, VA 21212

BUILT DATE: 2008  
GROSS FLOOR AREA: 23456 F<sup>2</sup>  
WEEKLY OPERATING HOURS: 168 HOURS

ENERGYSTAR  
SCORE-2013:  
**91** / 100

## ENERGY USE 2013:

### ELECTRICITY:

XXX BIY  
=XX  
U.S. HOUSEHOLDS

### NATURAL GAS:

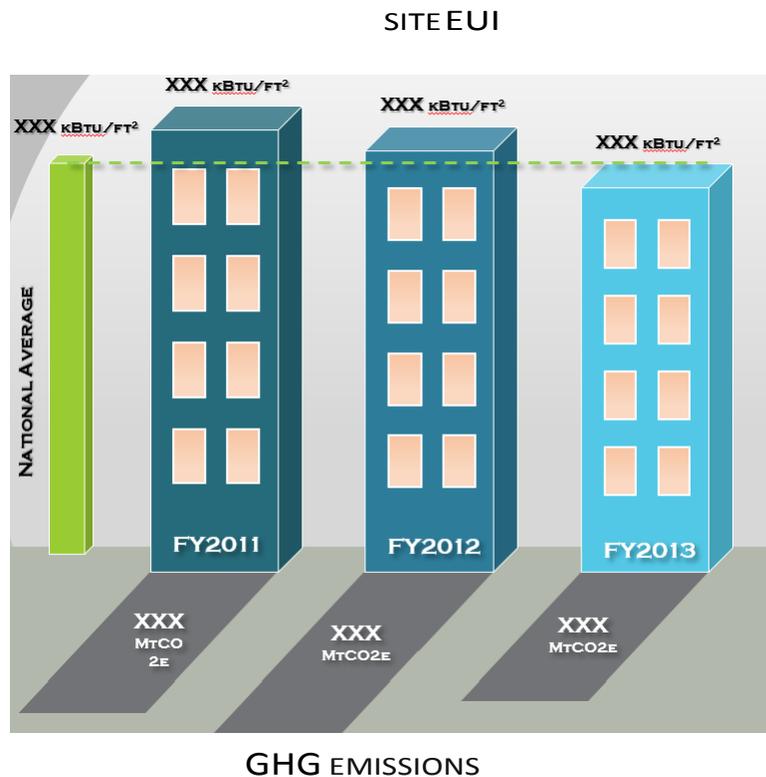
XXXKBIY  
=XX  
U.S. HOUSEHOLDS

### IMPROVEMENTS:

XXX2012  
XXX2009  
XXX2005

### SPECIAL CONDITIONS:

NONE



CITY OF ALEXANDRIA DEPARTMENT  
OF GENERAL SERVICES OFFICE OF ENERGY  
MANAGEMENT

Eco-CITY ALEXANDRIA

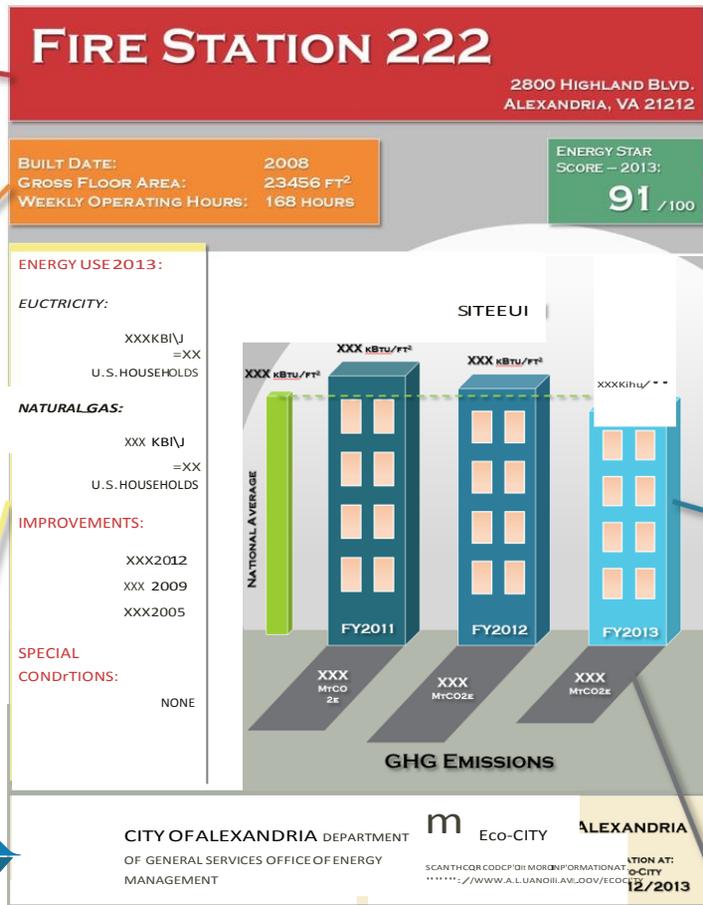
SCAN THE QR CODE FOR MORE INFORMATION AT:  
[HTTP://WWW.ALEXANDRIA.VA.GOV/ECD-CITY](http://www.ALEXANDRIA.VA.GOV/ECD-CITY)

12/2013

## 2.4 EPL Instruction

The following gives information about each of the EPL design elements.

The building's Name and address



The basic building characteristics and use properties.

**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.

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

**SITE - EUI:**

The building's annual EUI (Energy Use Intensity, measured in kBtu/ft<sup>2</sup>) 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.

**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 MtCO<sub>2</sub>e) 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.

## 2.5 General process to produce a label

The EPL communicates the ENERGY STAR Portfolio Manager Benchmark results. Most of the information displayed on the label is easy to generate using Portfolio Manager.

1. Checklist for information needed to generate an EPL<sup>13</sup>:

Elements	Definition
Building Basic Information	Name, Address, Year Built, Gross Floor Area, Weekly Operating Hours
Jurisdiction's Information	Jurisdiction Logo, Energy Benchmark Team, Online sources reference link
Building Special Conditions	Special Conditions
Energy efficiency improvements	Past/Undergoing applications/implementations of Energy Efficiency improvements of the building
Energy performance score	ENERGY STAR score
EUI performance data	EUI values for most recent 3 years
Total Electricity and Natural Gas use	Electricity and Natural Gas use of the most current year
Energy use equivalences	Total electricity use past fiscal year Total natural gas use past fiscal year
GHG emissions	GHG emissions for most recent 3 years
National/Regional Average	The national average EUI performance of similar type buildings provided by ENERGY STAR Portfolio Manager

2. Generate QR code to jurisdiction's website using Scanlife

Refer to [Get Started](#) to create a QR code and generate simple analysis of the QR code generated for free using Scanlife.

4. Input information to the right section of the label using EPL instruction as guidance.

Building height and shadow height are easily scalable.

---

<sup>13</sup> For more detailed explanation, refer back to 2.2.

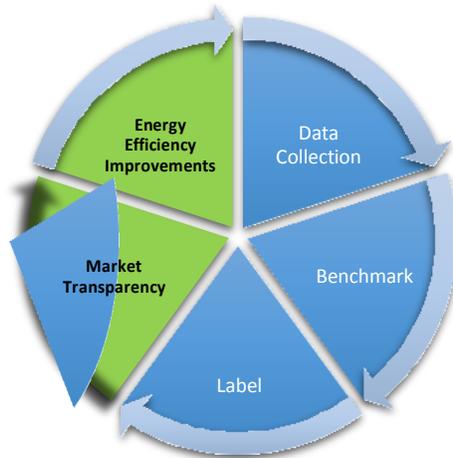
## **2.6 Feedback and future improvements on the label**

The example EPL's suggested information and graphic design elements are intended to be continually improved through feedback, innovations in public communication of energy efficiency information, and best practice in public engagement. Jurisdictions should consider using the provided example as a prototype to engage their stakeholders to solicit feedback and suggestion in order to develop a final version. The example EPL's content is intended to be updated annually; however, EPLs may be updated more frequently depending on capabilities and desired outcomes.

### 3.0 Future Efforts

This plan outlines a path to increase market transparency and inform and promote energy efficiency improvements in the region’s local government buildings. The plan also serves as a foundational model for guiding private commercial buildings to conduct voluntary benchmarking and labeling in the Northern Virginia. Ultimately, informing and promoting energy efficiency investments in Northern Virginia government buildings will contribute to reaching Northern Virginia jurisdiction’s goals of reducing energy use and costs and greenhouse gas emissions

[Fix Graphic]



**Appendices:**

**Appendix A: List of Acronyms**

<b>Acronym</b>	<b>Definition</b>
<b>NVRC</b>	Northern Virginia Regional Commission
<b>EPA</b>	Environmental Protection Agency
<b>JEM</b>	Joulex Energy Management
<b>EUI</b>	Energy Use Intensity
<b>GHG Emissions</b>	Greenhouse Gas Emissions
<b>EPL</b>	Energy Performance Label
<b>VEPGA</b>	Virginia Energy Purchasing Government Association
<b>MtCO<sub>2</sub>e</b>	Million Metric tons of Carbon Dioxide equivalence
<b>kBtu</b>	kilo British thermal unit
<b>ft<sup>2</sup></b>	Squared feet
<b>QR Code</b>	Quick Response Code

## Appendix B: List of Definitions

Term	Use	Definition
Performance Benchmarking Asset Benchmarking	Used in this plan	The operational performance benchmark of the building energy use
	Not in consideration in the this plan	The designed hardware benchmark of building
Property	Building <i>Property</i> Data	The properties of a substance or object are the ways in which it behaves in particular conditions.
	<i>Property</i> Use Details	A property is a building and the land belonging to it.
	<i>Property</i> Type	
<i>Type of use</i>		
Building type	<i>Primary function</i>	Building type
	<i>Property type</i>	
	<i>Space type</i>	

---

*This Guidebook was prepared in partial completion of requirements for an Interactive Qualifying Project at Worcester Polytechnic Institute by Nathan Costa, Mia Tomida, and Jiedong Wang.*

*The project was sponsored by the City of Alexandria, Virginia (Bill Eger, Energy Manager), and the Northern Virginia Regional Commission (Steve Walz, Director, Regional Energy Planning).*

*February, 2014*

