Evaluation of Implementing Energy Management System

for Anne Arundel County

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Agenda

- Introduction
- Evaluation of Energy Management Systems
- Pilot Implementation: a Case Study
- Learning Experience

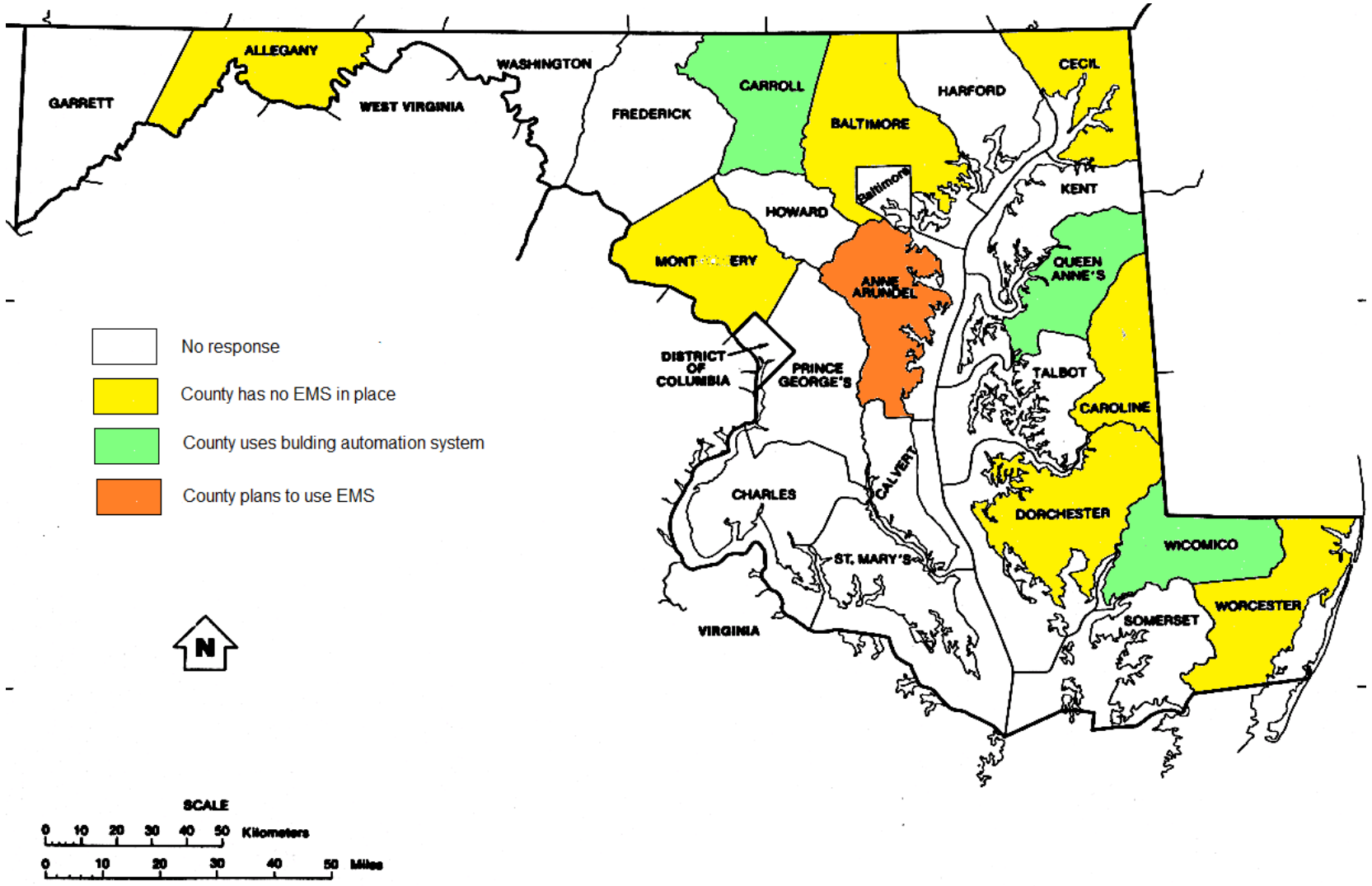
Problem Statement

- Lack of effective tracking on energy use at building level
- Fragmented databases – building stock, energy use, and maintenance
- Require data from BGE to perform energy analysis
- County needs an integrated system
  - To monitor and manage energy usage
  - To integrate energy use into capital investment decision making

Our Approach

Survey EMS Use in Maryland

- No county adopts county level EMS
- A few counties use building automation system



Existing EMS

Building Energy Management System is software and hardware that measure and track utility consumption, benchmark the performance of one building or a whole portfolio of buildings, with an object to reduce energy demand and achieve building energy efficiency.

- Cylon
- RtEMIS
- Building IQ
- EEM Suite
- Energy Star
- Bemoss
- Distech Controls

Features of Existing Software

	CYLON	RtEMIS	ENERGY STAR	EEM Suite	BUILDING IQ	BEMOSS	DISTECH Controls
Company	CYLON	RtTECH	ENERGY STAR	McKinstry	Building IQ	BEMOSS	Distech Controls
Software Type	Commercial	Commercial	Custom	Custom	Commercial	Custom	Commercial
Portfolio Capacity	Unlimited	Multiple	Unlimited	Unlimited	Unlimited	One	Multiple
Building Diversity	Any type of building	Any type of building	Any type of building	Any type of building	Any type of building	Small Commercial Buildings	Commercial Buildings
Number of Users	Multiple	Multiple	Multiple	Multiple	One	One	Multiple
Data Frequency	Every 15 minutes	Automated	Monthly	Real Time	Real Time	--	Real Time
Cost	Yes	Yes	No	Yes	Yes	Yes- for full version	Yes
Technical Support	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Presentation	Charts, Analysis, Alarms	Reports and Alerts	Reports, Charts, Graphs	Charts and Graphs	Reports and Graphs	Charts and Graphs	Charts and Graphs
Usability	Easy	Moderate	Easy	Moderate	Easy	Easy	Moderate

Energy Star

- Easy to use
- Can produce charts, graphs, and reports of energy consumption in buildings
- Access to the data is achieved through a secure web page, with a login
- Allows for a large portfolio of building
- Can work with any type of building for any type of meter
- Technical assistance through training sessions, technical information, and management tools
- There is no cost
- Information is easily populated into the system if information for the building and the meter are known

Energy Star

Properties (0)

Add a Property

Manage Portfolio

Download your entire portfolio to view all the information about your properties and your meter entries in one Excel spreadsheet.

Upload and/or update multiple properties at once using an Excel spreadsheet if you are a pro. This can be done to create new properties, add use details, create meters and add meter consumption data.

Set a portfolio baseline and/or target to help measure progress.

Add sample properties to your account. Up to five sample properties with pre-populated data will be added to your portfolio for testing purposes.

Notifications (0)

You have no new notifications.

You currently do not have any properties within your Portfolio Manager account. You can set up your first property or add up to five sample properties with pre-populated data to your portfolio. If this is your first time using Portfolio Manager, you may want to add sample properties to your portfolio in order to test out available features and see the look of a complete property.

Set up your first property

Add up to five sample properties

Energy Star

Your Property Type

We'll get into the details later. For now, overall, what main purpose does your property serve?

Select a property type

Learn more about Property Types.

Your Property's Buildings

How many physical buildings do you consider part of your property?

- **None**: My property is part of a building
- **One**: My property is a single building
- **More than One**: My property includes multiple buildings (Campus Guidance)

How many?

Your Property's Construction Status

Is your property already built or are you entering this property as a construction project that has not yet been completed?

- **Existing**: My property is built, occupied and/or being used. I will be using Portfolio Manager to track energy/water consumption and, perhaps, pursue recognition.
- **Design Project**: My property is in the conceptual design phase (pre-construction); I will be using Portfolio Manager to evaluate the energy efficiency of the design project.
- **Test Property**: This is not a real property. I am entering it to test features, or for other purposes such as training.

Get Started! Cancel

Tip

To set up a property, you'll need information such as gross floor area and operating hours.

Tip

Not sure what kind of property you are? Because we focus on whole building benchmarking, you want to select the property type that best reflects the activity in the majority of your building. Don't worry if you have other tenants with different business types, just select the main activity.

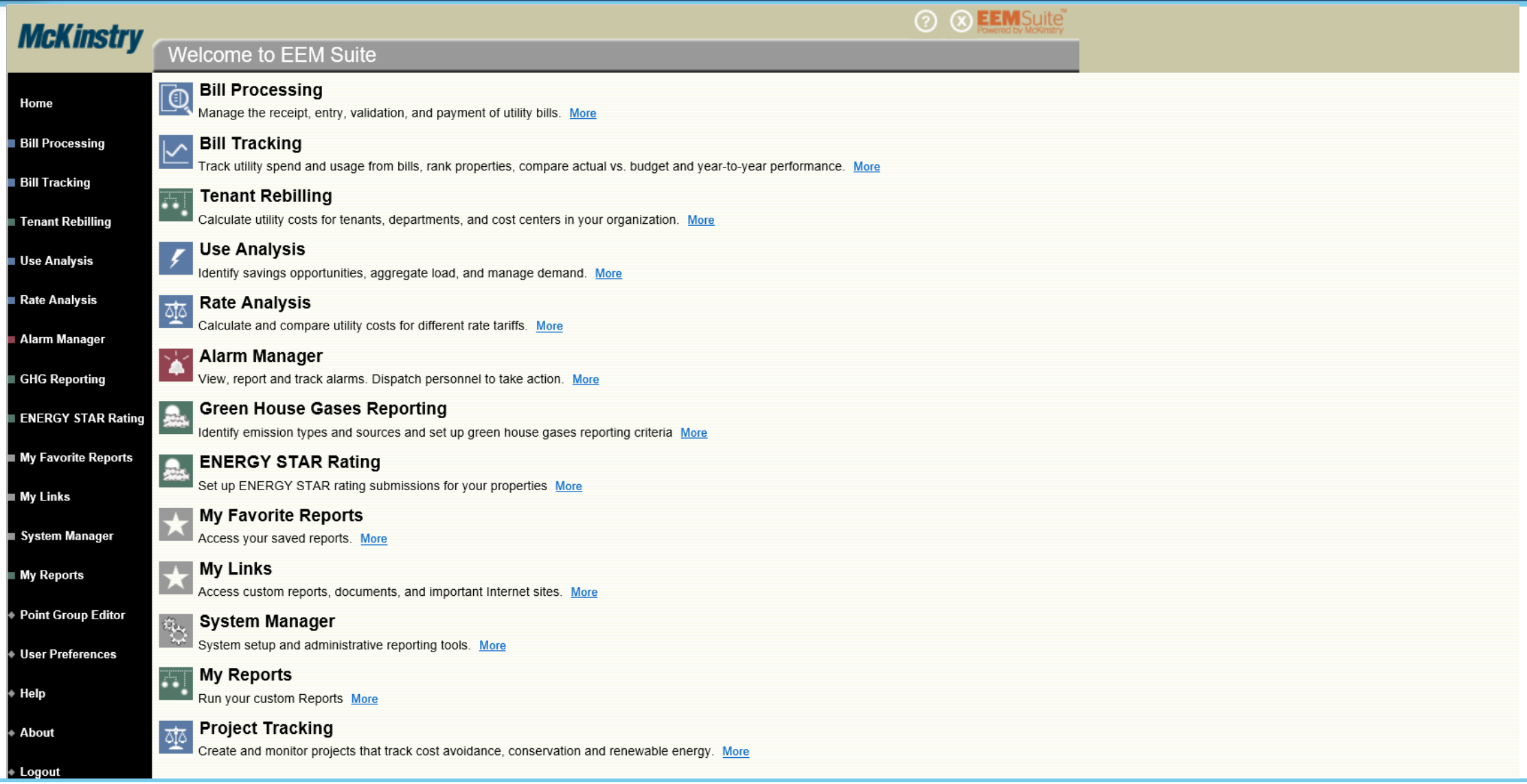
Test Properties

You may want to enter a property into Portfolio Manager that isn't actually a "real" property, either to familiarize yourself with features or maybe to train other people. By telling us this a "Test" property, we can give the option of including this property in your portfolio-level metrics, charts and table or not, depending what your needs are. This can be configured on your Account Settings.

EEM Suite

- Tracks energy in real time and can produce charts and graphs for the user to analyze
- An unlimited number of buildings that can be tracked using this software
- Can monitor energy consumption regardless of building size
- Technical assistance is offered 24/7 for this product
- Remote monitoring
- Cost associated
- Not very user friendly

EEM Suite


McKinstry
EEMSuite
Powered by McKinstry
Welcome to EEM Suite
Home
Bill Processing
Bill Tracking
Tenant Rebilling
Use Analysis
Rate Analysis
Alarm Manager
GHG Reporting
ENERGY STAR Rating
My Favorite Reports
My Links
System Manager
My Reports
Point Group Editor
User Preferences
Help
About
Logout
Bill Processing
Manage the receipt, entry, validation, and payment of utility bills. More
Bill Tracking
Track utility spend and usage from bills, rank properties, compare actual vs. budget and year-to-year performance. More
Tenant Rebilling
Calculate utility costs for tenants, departments, and cost centers in your organization. More
Use Analysis
Identify savings opportunities, aggregate load, and manage demand. More
Rate Analysis
Calculate and compare utility costs for different rate tariffs. More
Alarm Manager
View, report and track alarms. Dispatch personnel to take action. More
Green House Gases Reporting
Identify emission types and sources and set up green house gases reporting criteria More
ENERGY STAR Rating
Set up ENERGY STAR rating submissions for your properties More
My Favorite Reports
Access your saved reports. More
My Links
Access custom reports, documents, and important Internet sites. More
System Manager
System setup and administrative reporting tools. More
My Reports
Run your custom Reports More
Project Tracking
Create and monitor projects that track cost avoidance, conservation and renewable energy. More

EEM Suite

McKinstry

EEMSuite™ Powered by McKinstry

Time Interval report

- Home
- Bill Processing
- Bill Tracking
- Tenant Rebilling
- Use Analysis
  - Trending
    - Time Interval
    - Usage Variance
    - Multi-Point Trend
    - 3D Surface Chart
    - Scatter Plot
    - Single Point Digital
    - Multi-Point Digital
  - Load Aggregation
    - Average Hourly Profile
    - Aggregate Demand
    - Aggregate Peak Load
  - Demand Management
    - Load Duration Curve
    - 24 Hour Line Chart
    - Histogram
  - Use Benchmarks
    - Summary
    - Statistical Summary
    - Data View and Export
- Rate Analysis
- Alarm Manager
- GHG Reporting
- ENERGY STAR Rating

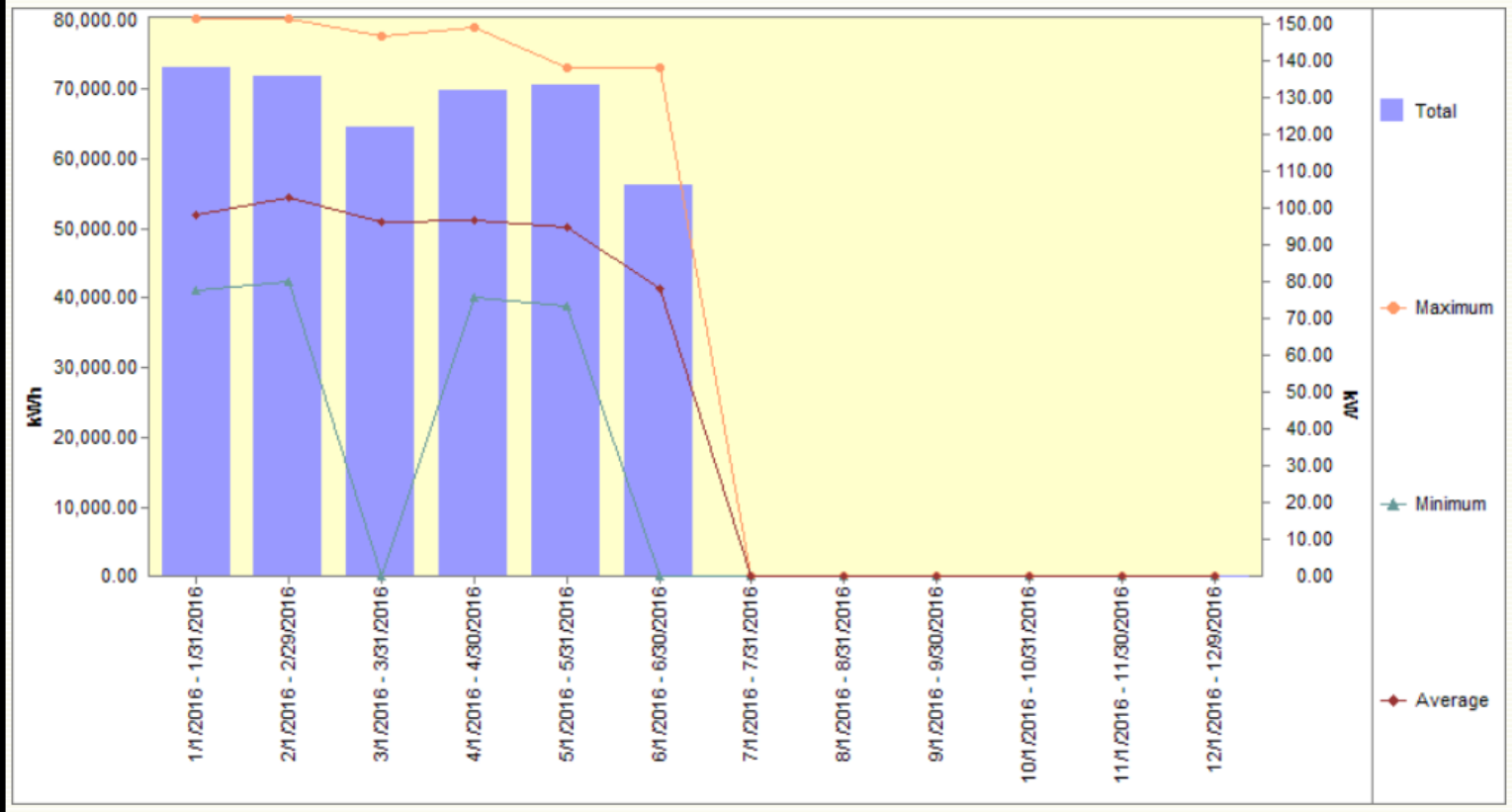
Report date: 12/9/2016 12:20:57 PM

Report span: 1/1/2016 - 12/9/2016

Day of week: All days

Total days: 344

Time Interval report



Cylon

- User-friendly
- Commercial
- Reports in real time through charts, reports, and alarms
- Can connect an unlimited number of meters to the system
- Comes with a cost
- Works for large commercial buildings and smaller residential ones
- Central monitoring
- Technical assistance is offered over the phone with 24/7 support

Evaluation Criteria

- Portfolio Capacity
- Building Diversity
- Number of Users
- Cost
- Technical Support
- Data Presentation
- Data Update Frequency
- Interface Usability

Numerical Ranking

	CYLON	RtEMIS	ENERGY STAR	EEM Suite	BUILDING IQ	BEMOSS	DISTECH Controls
Portfolio Capacity	3	2	3	3	3	1	2
Building Diversity	2	2	2	2	2	1	1
Number of Users	2	2	2	2	1	1	2
Cost	1	1	2	1	1	1	1
Technical Support	1	1	1	1	1	1	1
Data Presentation	2	1	2	1	1	1	1
Data Update Frequency	2	2	1	2	2	NA	2
Usability	2	1	2	1	2	1	1
TOTAL	**15**	**12**	**15**	**13**	**13**	**8/9**	**11**

GRADING SCALE

NA- Not Available
1- Lower Capacity
2- Higher Capacity

If there were 3 options:
NA- Not Available
1- Lower Capacity
2- Middle Capacity
3- Higher Capacity

Comparisons

- Cylon & Energy Star, EEM Suite & Building IQ, RtEMIS, Distech Controls, Bemoss
- Cylon has a cost while Energy Star does not
- Cylon updates energy data in real time.
- Energy Star updates monthly

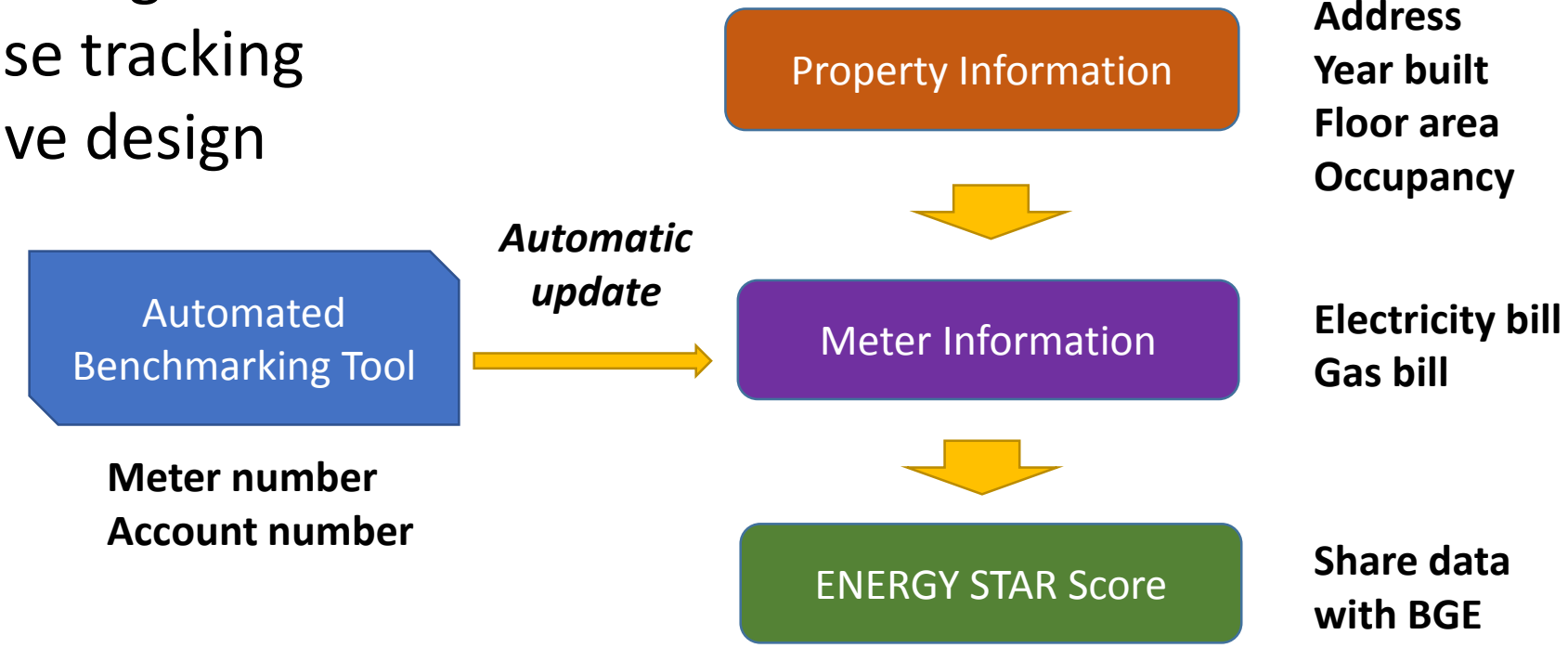
Recommendation

- Depends on what features are more important
- Updates vs. cost
- Since Energy Star is free therefore might be more practical for starting out
- County officials stated real time updates are not as important at this point
- Recommend Energy Star as case study

Case Study: Energy Star Portfolio Manager

System Functionality

- Benchmarking
- Energy use tracking
- Alternative design



Energy Performance Estimation Flowchart

Automated Benchmarking Tool

- Account number
- Building verification
- Consent form
- Virtual meter number

ENERGY STAR Portfolio Manager

1. Property type
2. Address information
3. Use detail
4. Meter information
5. Data exchange with BGE
6. ENERGY STAR Score

Data Collected from the County

Name	Street address	Gross floor area (sq.ft)	Meter number (E-electric, G-gas)	Acct #
Arundel Ctr	44 Calvert St.	91992	E9074751000 G 9074768935 E 1138181000 E9615040000	8015
Arundel Ctr. Parking lot	44 Calvert St.		E0152302000	
Court House	8 Church Circle	236852	E 7913800000 G 7913805621 E 7155600000	8005
Health Dept.	3 Harry S. Truman	105421	E 8974112000	8115
Heritage 2660	2660 Riva Rd	51484	E 9533931000	8058
Heritage 2662	2662 Riva Rd	51484	E8282291000	8059
Heritage 2664	2664 Riva Rd	51484	E 5387530000 E 1755480000 E 5250302000	8060
Heritage 2666	2666 Riva Rd	51484	E 4473112000	8061
Heritage Office Ctr.	2660-2666 Riva Rd		E 0382840000	8108
Library-Provinces	2624 Annapolis Rd.	11500	E7763631000 G7763623758 E7330900000 G7330947800	
Library W. County	1325 Annapolis Rd.	9000	E 2541671000 E6098031000 G 6098089478 E1666571000	8167
Pascal Senior Ctr.	125 Dorsey Rd.	15000	E2243421000	8128

Result Example

Arundel Center

44 Calvert St., Annapolis MD 21401

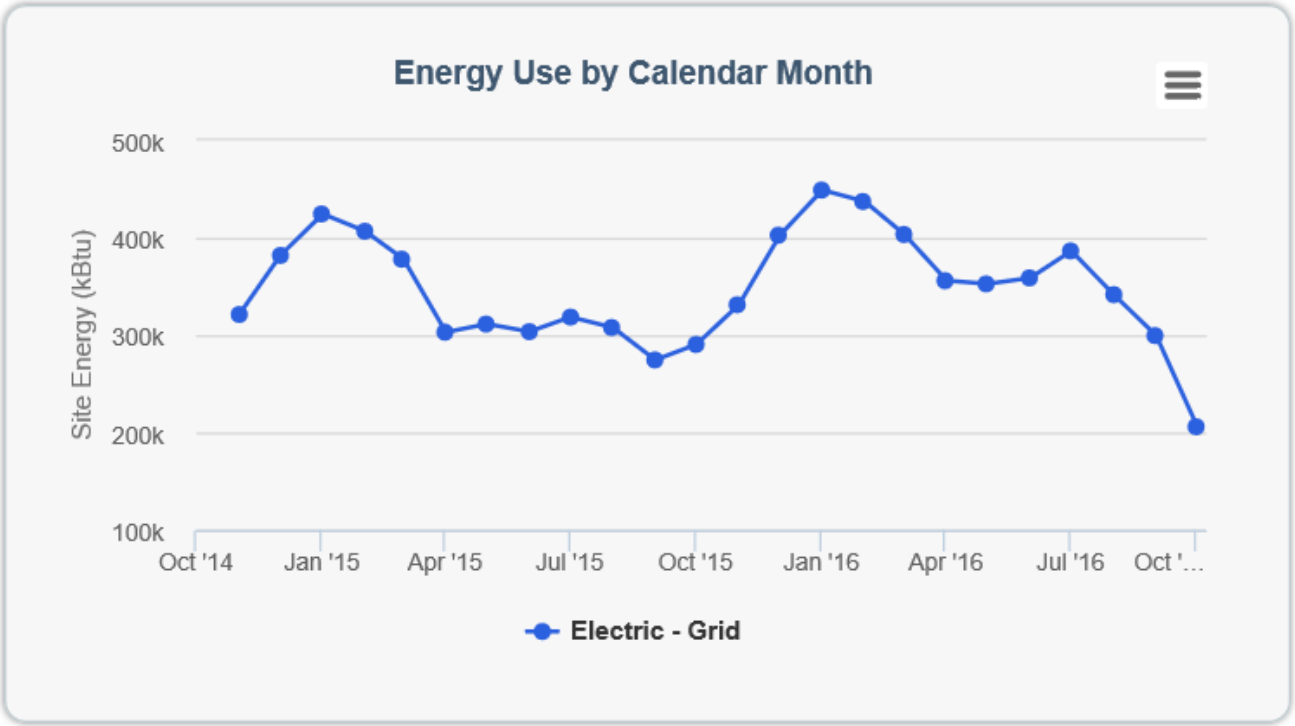
Benchmarking

ENERGY STAR Score (1-100)	
Current Score:	97
Baseline Score:	89

Cross country comparison

Self comparison

Monthly utility reports



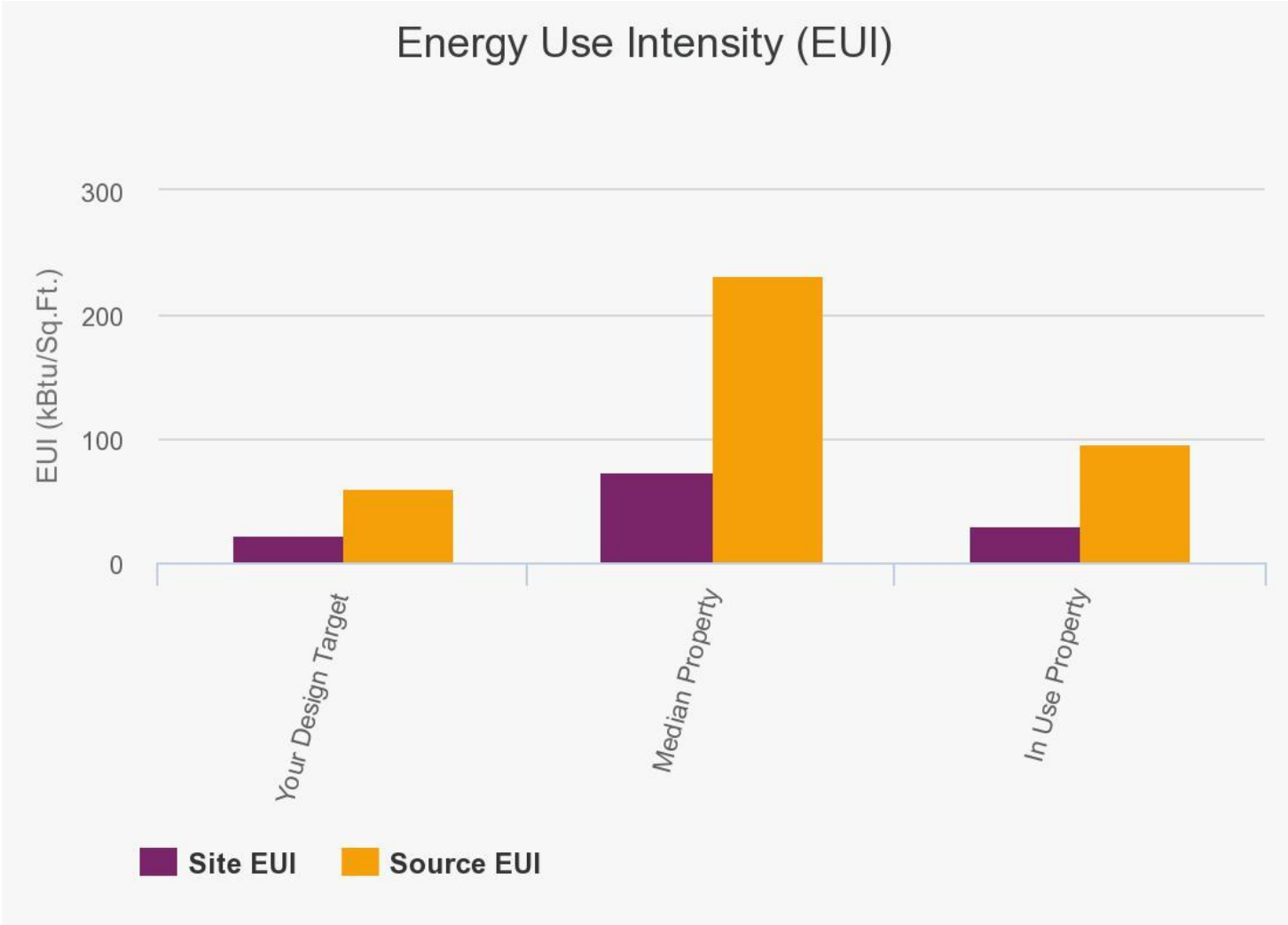
Result Example

Arundel Center

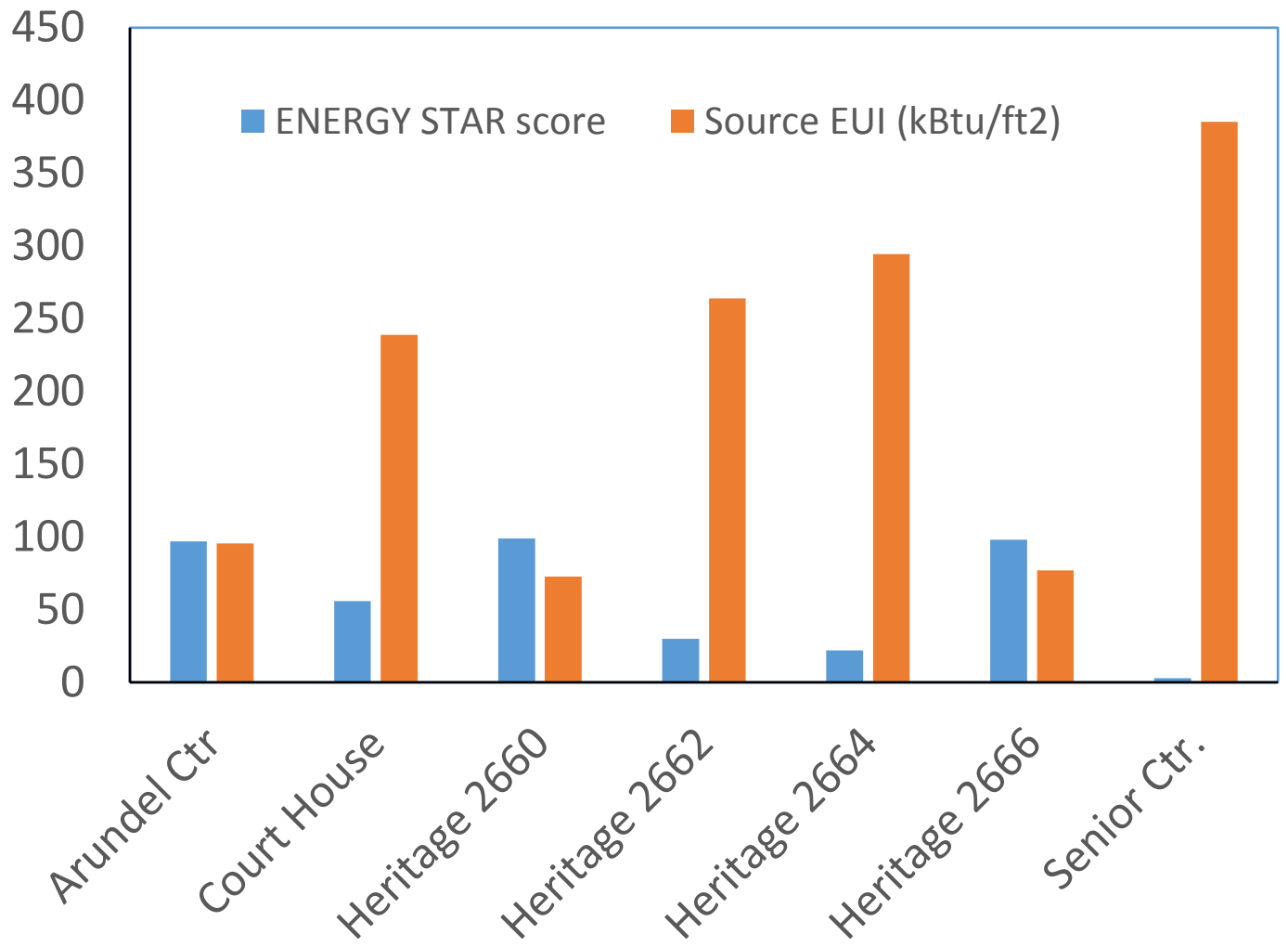
44 Calvert St., Annapolis MD 21401

Alternative Design

- Weekly operating hours
- Number of works on main shift
- Number of computers
- Percent that can be heated
- Percent that can be cooled



Building Energy Performance



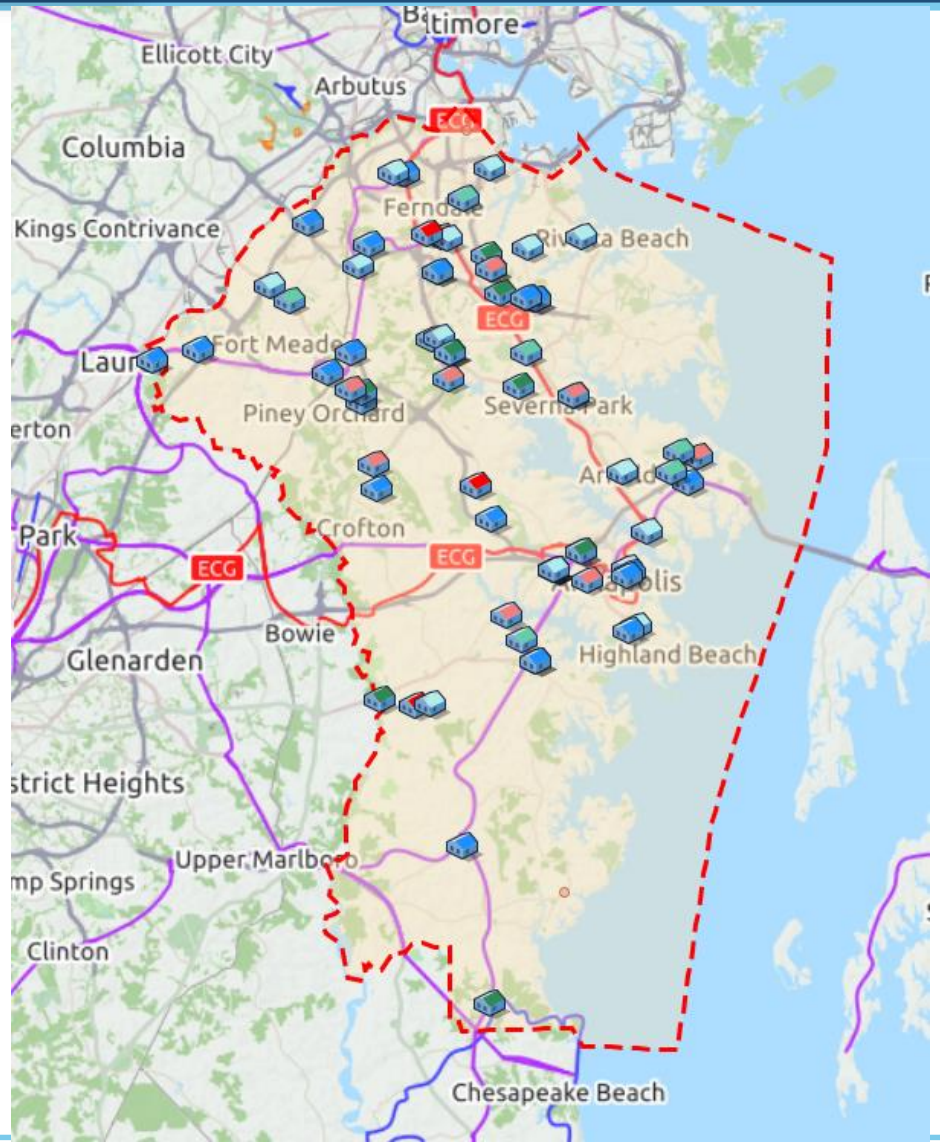
ENERGY STAR Scores

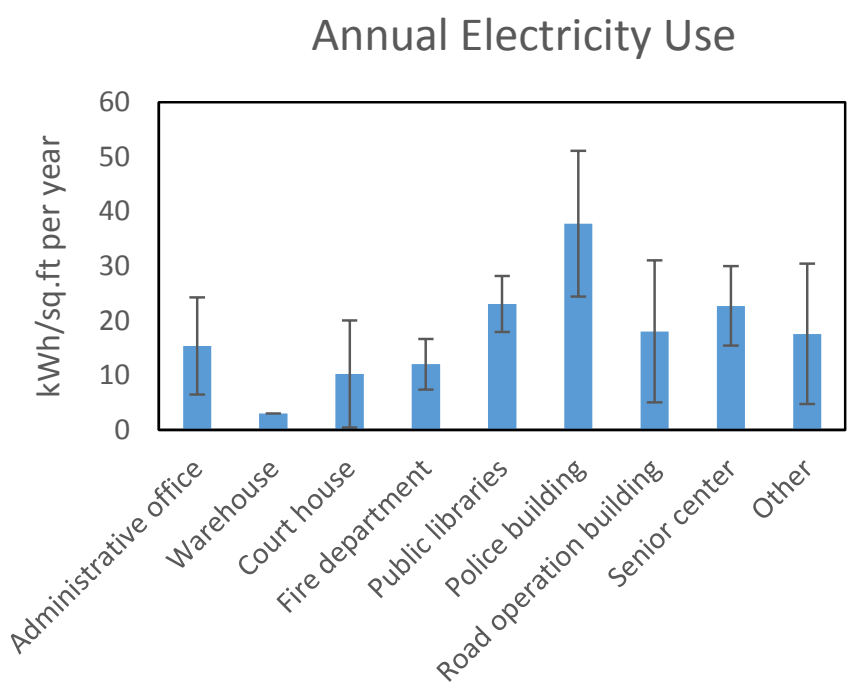
Average: 58 / 100

Highest: 99 / 100

Lowest: 3 / 100

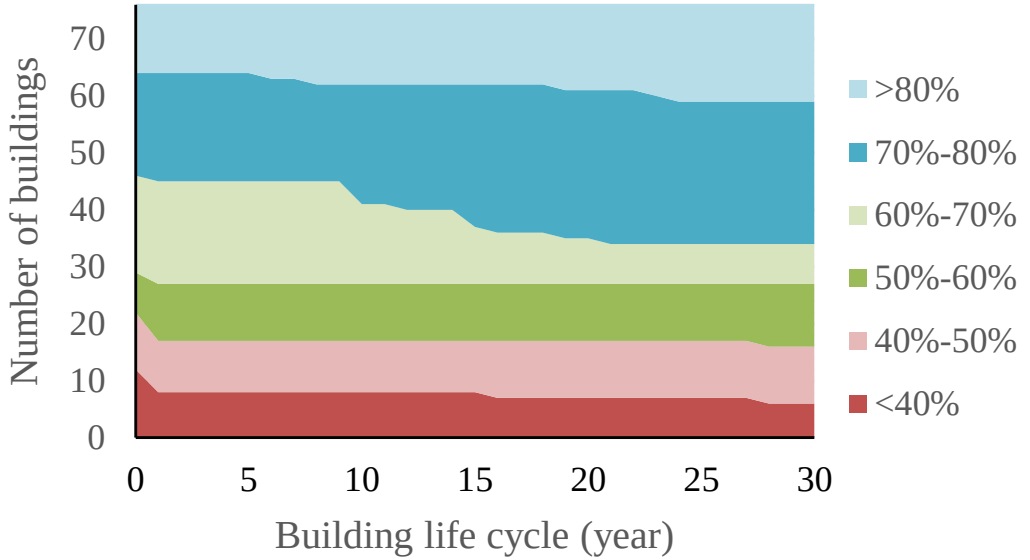
Extension





Energy Use Analysis

Energy Savings Investment



Learning Experience

- Understand county's needs in energy management
- Real observation of county's building energy consumption
- Hands-on experience in ENERGY STAR Portfolio Manager
- Practice with a quantitative analysis
- Comprehension of energy management
- Analysis of current energy management software

THANK YOU!!

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