

Better Buildings[®]
CHALLENGE
U.S. DEPARTMENT OF ENERGY

**Energizing Facilities:
Modernization & Energy
Efficiency**
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**APPA 2018
Conference & Expo
August 3, 2018**

U.S. DEPARTMENT OF
ENERGY

Learning Outcomes

- Understand the basics and benefits of benchmarking for K-12 Schools.
- Employ best practices used by Alexandria City Public Schools, Anne Arundel County Public Schools, and Fairfax County Public Schools.
- Share success stories on how to develop a facilities master plan that incorporates energy efficiency into building modernization.
- Learn about the Better Buildings Challenge and the 28 BBC K-12 school sector partners who have joined with the Department of Energy to commit to a 20% reduction in energy use intensity over 10 years across their building portfolios.

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Agenda

- **Better Buildings Challenge - K-12 Portfolio Overview**
 - Crystal McDonald, K-12 Schools Lead, US Department of Energy
- **Creating an Energy Management Program**
 - Indrajeet Viswanathan, Energy Manager, Alexandria City Public Schools, Alexandria, VA
- **Measuring Building Energy Performance**
 - Justin Moss, Coordinator, Energy Management, Fairfax County Public Schools, Falls Church, VA
- **Making the Most of Building Automation Systems for Energy Management**
 - Zachary Lammers, Program Manager - Energy Conservation, Anne Arundel County Public Schools, Operations Division, Pasadena, MD
- **Questions & Answers**

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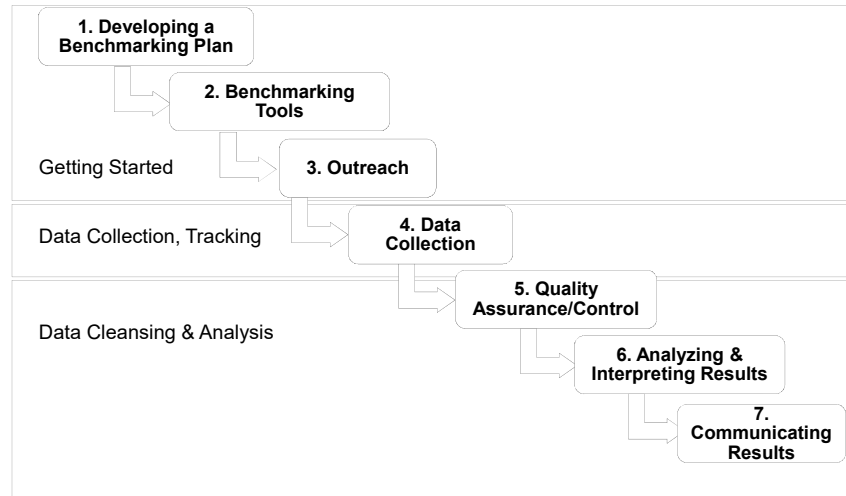


Better Buildings Challenge: K-12 Portfolio Overview

Crystal McDonald, K-12 Schools Lead
Office of Energy Efficiency & Renewable Energy
U.S. Department of Energy



Benchmarking and Energy Data Collection



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Better Buildings K-12 Partner Results



PROGRAMS [Contact Us](#)

SOLUTIONS

PROGRAMS & PARTNERS

SUMMIT & SWAP

LEARN MORE

EXPLORE BY TOPICS BROWSE SOLUTION TYPES TOOLKITS FINANCING NAVIGATOR

SOLUTIONS

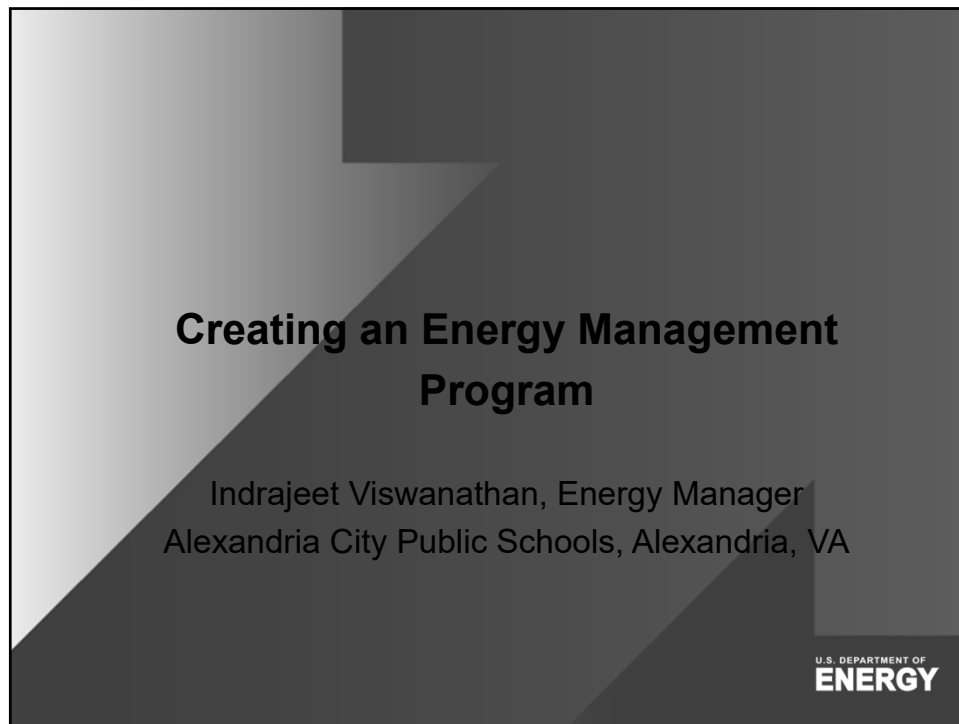
Find solutions shared by Better Buildings partners to bolster their bottom line efficiency investments. Search for solutions by keyword or topic.

betterbuildingssolutioncenter.energy.gov

- [Farias Early Childhood Center Retrocommissioning](#)
Partner: Houston Independent School District, TX
- [Parkway West High School Retro-Commissioning Project and HVAC Maintenance Improvements](#)
Partner: Parkway School District, Chesterfield, MO
- [River Trails Middle School](#)
Partner: River Trails School District 26, Mt. Prospect, IL
- [Warner Middle School Lighting and Controls Showcase Project](#)
Partner: Xenia Community Schools
- And many more [project results](#)

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Alexandria City Public School – Fast Facts

- (12) Elementary, (1) Pre K-8, (2) Middle, (1) High School (2 campuses), (1) Rowing facility, (1) Transportation Department, (1) Maintenance/Warehouse, (1) Commercial Parking Garage.
- Year 2018 - 15,493 Students & 2,352 staff
- Total square foot age – 2.5 million square feet

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Planning – Step 1

- Identify the current state of energy affairs
- Historic efforts, success and failures
- Internal stake holders – O&M, Procurement, Finance, Planning)
- External stake holders – Utility companies, contractors, products leads
- Bringing it all TOGETHER

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Doing it – Step 2

Investigative Phase

- How does the data entry takes place
- Are all accounts being used/monitored
- Facilities owned vs rented

Data Collection Phase

- Setting up online utility accounts, interval data access, and smart meter requests
- Energy Star portfolio manager
- Ranking your facilities on EUI and importance

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Study– Step 3

- Physical site visits to verify actual conditions
- Energy audits on highest EUI's sites
- Set and analyze trends
- Identify savings through behavioral changes
- Verify anomalies through building management system
- Identify discarded green features of your building

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Act – Step 4

Act on “NO COST” Energy Savings

- Disconnect unused meters/accounts
- Rate structure negotiations
- New utility contracts negotiations
- Present findings to stakeholders from Planning, Doing & Checking
- Social media presence

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Summary

- Set an energy management goal
- Tie energy management with student learning
- Identify energy champions in each school
- Repeat Plan, Do, Check, Act - AT COST
- Remember at K12 schools, we are not in the business of energy reduction or energy savings but active energy management

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Measuring Building Energy Performance

Justin Moss, Coordinator
Energy Management
Fairfax County Public Schools, Falls Church, VA



Measuring Building Performance

- Fairfax County Public Schools (FCPS) is the 10th largest school division in the nation.
 - 189,000 Students
 - 23,000 Employees
 - 27 million square feet
 - 221 Facilities
 - 142 Elementary Schools
 - 23 Middle Schools
 - 28 High/Sec/Alt Schools
 - 23 Centers/Community Buildings
 - 5 Lease Properties
- One of our main goals is to do everything possible to reduce operating and support costs to devote resources to our primary mission - instruction.



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Measuring Building Performance

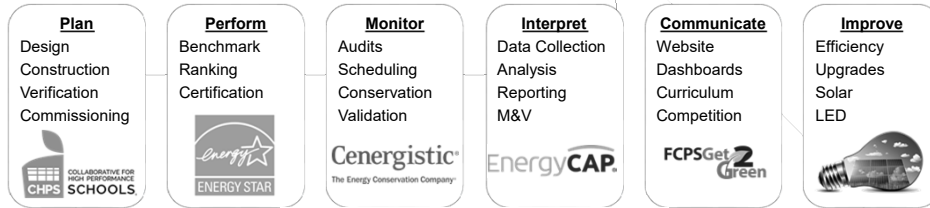
- FCPS has multi-faceted approach to measuring building performance that includes: *design, performance, replacement, data collection, analysis and education.*
- Benchmarking Tools:
 - VA-CHPS
 - ENERGY STAR
 - Cenergistic
 - EnergyCAP
 - Asset Management
 - Get2Green



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Measuring Building Performance



- Streamlined process from beginning to end

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Measuring Building Performance

- The **Collaborative for High Performance Schools (CHPS)** is a California-based nonprofit organization that was founded in 1999, but quickly expanded to a national benchmarking platform.
- CHPS partners with state school-building officials to create standards for high-performance schools.
 - Over 300 completed CHPS schools across America
 - 300 more schools currently seeking CHPS certification
 - 41 school districts have committed to CHPS standard or using CHPS resources
- The goals of CHPS are to fundamentally change the design, construction, and operation of schools to:
 - Protect student and staff health and enhance the learning environments of school children everywhere.
 - Conserve energy, water, and other natural resources.
 - Reduce waste, pollution, and environmental degradation.
- In 2011, CHPS released a school rating system for the design and construction of schools in Virginia.
 - Virginia was the 12th state to adopt CHPS criteria and uses it in all new construction and renovation projects.
- Eleven other states have state or region-specific high performance school building Criteria, including:
 - California, Washington, New York, the Northeast States (Massachusetts, Rhode Island, New Hampshire, Connecticut, Vermont, and Maine), Texas, and Hawaii. Colorado has adopted the national US-CHPS Criteria.
 - The goal of this state-specific benchmark system, Virginia CHPS Criteria (VA-CHPS), is to provide guides for developing energy-efficient, comfortable, environmentally responsible, and healthy learning centers.



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Measuring Building Performance

CHPS Resources

- CHPS provides resources about all aspects of high performance school design, construction, and operation. include:
 - six-volume best practices manual,
 - training and conferences,
 - a high performance building rating and recognition program,
 - other tools for creating healthy, green schools.

VA-CHPS

- Virginia CHPS contains prerequisites and credits that reflect the changing nature of school design and construction in Virginia. It offers:
 - Credit for Building Information Modeling (BIM), acknowledging how technology can be used to reduce wasteful construction mistakes in the design phase.
 - VA-CHPS provides greater incentives for energy management systems.
 - Local resources such as the Virginia School Facilities Guidelines for Acoustics and the Virginia Storm water Management Program are referenced throughout the Criteria.
 - The committee also uses point distribution to include environmental priorities in Virginia.
- Recognition Programs Available in Virginia:
 - CHPS Design Program
 - CHPS Verified Program



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Measuring Building Performance

- ENERGY STAR** is a voluntary program offered by the EPA that helps businesses and individuals save money and protect the climate through superior energy efficiency.
- It was established by the EPA in 1992, under the authority of the Clean Air Act. Under the EPA's leadership, American consumers, businesses, and organizations have made investments in energy efficiency that are transforming the market for efficient products and practices, creating jobs, and stimulating the economy.
- To earn ENERGY STAR certification, a facility has to be certified by a third-party engineer and rank among the top 25 percent building energy use in its peer group, nationwide.
 - With 151 schools, FCPS has the most ENERGY STAR certified buildings of any school division nationwide.



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Measuring Building Performance



- **ENERGY STAR Portfolio Manager®** is an online tool you can use to measure and track energy and water consumption, as well as greenhouse gas emissions. Use it to benchmark the performance of one building or a whole portfolio of buildings, all in a secure online environment.
- **How is your buildings ENERGY STAR score calculated?**
 - Based on the information you entered about your building in the ENERGY STAR Portfolio Manager (i.e. – size, location, number of occupants, number of PCs, etc.)
 - The score's algorithm estimates how much energy the building would use if it were the best performing, the worst performing, and every level in between. It then compares the actual energy data you entered to the estimate to determine where your building ranks relative to its peers.
 - All of the calculations are based on source energy and account for the impact of weather variations, as well as changes in key property use details.
 - To estimate how much energy your building would use at each performance level, EPA conducts statistical analyses on the survey data. For each type of building for which there is an ENERGY STAR score, EPA goes through a rigorous process that involves:
 - Ensuring the quality and quantity of the data will support an ENERGY STAR score
 - Creating a statistical regression model that correlates the energy data to the property use details to identify the key drivers of energy use
 - Testing the model against thousands of buildings in Portfolio Manager
 - A score of 50 represents median energy performance, while a score of 75 or better indicates your building is a top performer — and may be eligible for ENERGY STAR certification.

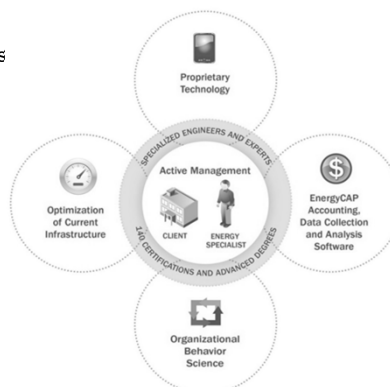
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Measuring Building Performance

- In 2014, FCPS partnered with Cenergistic to provide energy management, conservation, and educational services division wide.
 - Engineers work on-site with your operations staff to pinpoint the strengths and opportunities in your current energy program.
 - Energy specialists ensure that the program is working every day, all the time, in every building.
 - Cenergistic's process to measure and verify savings is rigorous, transparent and conforms to accepted industry guidelines.
 - Quality checks at every step of the process ensure the accuracy of your savings information.

Cenergistic®
The Energy Conservation Company®



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Measuring Building Performance

- **EnergyCAP** is an energy accounting software used for tracking, managing, processing, reporting, benchmarking, and analyzing utility bills and energy.

- Interfaces with Energy Star's Portfolio Manager.

- Features include:

- Account & Meter Tracking
- Budgets & Forecasts
- Bill Entry & Accruals
- Auditing
- Normalization
- Benchmarking
- Energy Use Intensity
- Cost Avoidance
- Use vs. Weather
- Rates & Tariffs
- Dashboards
- Reporting
- Greenhouse Gases

EnergyCAP.



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Measuring Building Performance



- **Get2Green** is the award-winning environmental stewardship program for Fairfax County Public Schools (FCPS).

- Formed in 2010, by a group of FCPS principals who came together to share and explore methods for engaging in environmental stewardship activities in school.
- Get2Green's mission is to promote student learning and action using the environment as a foundation.
- We will be model environmental stewards by investing in green infrastructure and resources, utilizing interdisciplinary environmental curriculum, and fostering community partnerships.



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Measuring Building Performance

▪ **RECENT ACCOMPLISHMENTS**

- **ENERGY STAR Partner of the Year in 2017 and 2018.**
- **151 ENERGY STAR building certifications in 2016.**
 - The most of any school division in the nation two years in a row.
 - FCPS also played a key role in helping Washington D.C. achieve the EPA's #1 city for ENERGY STAR certified buildings for a third year.
- **More than \$20 million in cost avoidance savings since 2014.**
- **Quantifiable reductions in utility use division-wide:**
 - 13.5% reduction in total energy use since 2014.
- **Significant environmental impact:**
 - More than 93,000 metric tons of CO₂e reduced since 2014.
 - Equal to more than 2.4 million tree seedlings planted; or
 - More than 19,500 cars not being driven for one year.
 - Annual greenhouse gas inventory report provided to the School Board.
- **Cross disciplinary meetings with students, community members, local businesses, environmental committees, faith based organizations, etc.**
- **Partnering with various local, state and federal associations including:**
 - U.S. Environmental Protection Agency (EPA) – 2017 and 2018 ENERGY STAR Partner of the Year
 - U.S. Department of Energy – 2016 Better Building's Challenge Award Winner
 - U.S. Department of Education – 2016 Green Ribbon Schools Award Winner
 - National Wildlife Federation (NWF) – Eco Schools USA Program
 - Metropolitan-Washington Council of Governments (MWCOG) – 2015 Climate and Energy Leadership Award Winner
 - Virginia Collaborative for High Performance Schools (VA-CHPS) Verified Program
 - Virginia Energy Efficiency Council (VAEEC) – 2016 and 2017 Award Winner
 - Virginia School Board Association (VSBA) – Green Public Schools Challenge platinum member
 - Virginia Energy Purchasing Government Association (VEPGA)
 - George Mason University's & NOVA Outside – Student Environmental Action Showcase (SEAS)

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Making the Most of Building Automation Systems for Energy Management

Zachary Lammers, Program Manager
 Energy Conservation
 Anne Arundel County Public Schools, Operations
 Division, Pasadena, MD



Setup

- Energy Management: *How We Use It, When We use It, How we Buy It...*
- HVAC is primary source of energy consumption in K-12 buildings...
 - Is **Expensive Equipment** running when it should be off?
 - Are they entering night heat / cool?
 - Are they running in occupied / unoccupied dehumidification too frequently?
 - Am I masking problems by thinking I have to run it all the time?
 - Are my **Controls** doing what they are supposed to be doing?
 - Do I need to run the **Whole Building** when only a fraction is used in the summer?
 - Can I shut down equipment an hour or two before typical end of day?
 - Night Survey – “What’s running that shouldn’t be?”
- Leverage our Building Automation Platforms to answer these fundamental Energy Management questions...

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Common Challenges Faced

- Scale / Number of Facilities
- Diversity of Systems & Protocols
 - Historical Procurement led to multiple vendor-platforms
 - Legacy Systems with limited capability
- Increasing System Complexity
 - ATC sequence variation
 - Engineer-to-Engineer
 - Evolving Energy Code
- Multiple End Users
 - With Access and varying degrees of training...

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Solutions

- Global Scheduling centrally managed for over 1,000 pieces of equipment
 - Supports after-hours and weekend activities
 - Supports other building and district level needs
 - Extreme Weather
 - Demand Response
- Implementing Standardized ATC Sequences
 - Proven sequence of operations
 - Easier to troubleshoot
 - Easier to scale
 - Ex: Chiller Plant Enable
- Leverage Custom Analytics, Reporting & Notifications
 - Weekly Runtime Reports, Override Reports
- Use Custom Querying & Dashboarding Capability
- Provide Visibility to Building Personnel

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Solutions Continued...Global Schedules

Example Areas Impacted by Global Schedules...											
Global Schedule	Admin	Classroom Area A	Classroom Area B	Classroom Area...	Kindergarten	Cafeteria	Kitchen	Gym	Media	Computer Lab	Comments
EnemNoc	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	Temporarily Unoccupied	enemnoc temporarily overrides all schedules at enemnoc schools for DR situations...
24.7	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	Occupied All Day/Night	24.7 makes all units run occupied...
Code Red (no activities)	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	this unoccupies the building and overrides any previously entered special requests because Code Red means no after hours activities...
Code Blue (no activities)	Occupied 8am-4pm	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	This unoccupies the building except the Admin and overrides any previously entered special requests because Code Blue typically means no after hours activities...
Special Energy Requisitions	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	Occupied for Specific Time	these are special requests like basketball games over a holiday break or after school activities in the summer that require certain areas to run while the rest of the school can remain in holiday mode...
Holidays	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	this unoccupies the building for holidays like spring break but still allows special requests like Church etc. to go on...
Holiday Admin	Occupied 8am-4pm	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	this unoccupies the building for holidays like Christmas break but keeps the admin area running on normal schedule...
Summer Fridays	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	Unoccupied Friday All Day/Night	this unoccupies the buildings on 6 out of 10 summer Fridays where this no admin or summer school use...and needs to be a higher priority than Summer Hours
Summer Hrs	Occupied 8am-4pm	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	Unoccupied All Day/Night	this runs the admin and areas needed for summer class, parks n rec, etc. this schedule is unique to each school but is globally implemented...
2 Hr Early Schedule	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	Occupied 2 hours early	this can be used after a long weekend on extremely cold/hot nights to help each building reach temp by occupancy...
Election Day	Unoccupied	Unoccupied	Unoccupied	Unoccupied	Unoccupied	Occupied 8am-1pm	Unoccupied	Unoccupied	Unoccupied	Unoccupied	this unoccupies the building for holiday but permits the cafeteria to run which is where elections typically take place...



Solutions Continued...Standard ATC Sequences

DIVISION 23 – HVAC DESIGN STANDARDS
SECTION 23 90 00 AUTOMATIC TEMPERATURE CONTROLS
ANNE ARUNDEL COUNTY PUBLIC SCHOOLS

DIVISION 23 – HVAC DESIGN STANDARDS
ANNE ARUNDEL COUNTY PUBLIC SCHOOLS

THIS DOCUMENT IS A DESIGN STANDARD, NOT A SPECIFICATION

ATC SEQUENCES

PART 1 – GENERAL

1.10 SECTION INCLUDES:

- A. Design Considerations
- B. Technical Considerations
- C. General Requirements
- D. Zones
- E. Temperatures and Set Points
- F. Schedules
- G. Sequences
- H. Graphics
- I. Direct Digital Building System Components
 1. Wiring, Conduits, and Panels
 2. Control Dampers
 3. Control Valves
 4. Variable Frequency Drives (VFD)
 5. Instrumentation and Control Devices
- J. Training

1.20 DESIGN CONSIDERATIONS

- A. Refer to section 23 00 00 – HVAC for GENERAL REQUIREMENTS, Code Information, and Standards Information.

1.30 TECHNICAL CONSIDERATIONS

- A. LEED, IECC Compliance Items planned for the project are to be discussed with AACPS before specifications are completed.
- B. See "GENERAL REQUIREMENTS" in PART 2 of this section for addition design and technical considerations before developing the automatic temperature control system (ATC) for each project.

PART 2 – PRODUCTS

2.10 GENERAL REQUIREMENTS

- A. The ATC system shall be a Direct Digital Control (DDC) system.

GENERAL ITEMS (GI)

- GI-1 General Notes for ATC System
- GI-2 Auto-Occupied/Unoccupied Control

CENTRAL PLANT EQUIPMENT (CPE)

- CPE-1 Heating Water Plant Sequence
- CPE-2 Chilled Water Plant Sequence-Air Cooled Chiller
- CPE-3 Chilled Water Plant Sequence-Water Cooled Chiller
- CPE-4 Chiller Room Ventilation and Refrigerant Control

TWO (2) PIPE SYSTEMS (TPS)

- TPS-1 Fan Coil Unit-2 Pipe Chilled/Heating Water
- TPS-2 Unit Ventilator-2 Pipe Chilled/Heating Water
- TPS-3 Two Pipe System Isolation Valves

FOUR (4) PIPE SYSTEMS (FPS)

- FPS-1 Fan Coil Unit-4 Pipe Heating Water and Chilled Water
- FPS-2 Unit Ventilator-4 Pipe Heating Water and Chilled Water

AIR HANDLING UNITS (AHU)

- AHU-1 Air Handling Unit – Single Zone VAV
- AHU-2 Air Handling Unit – VAV with SF and RF
- AHU-3 Rooftop Energy Recovery Unit-2 Pipe Chilled/Heating Water and DX Cooling
- AHU-4 Energy Recovery Unit-4 Pipe Heating Water and Chilled Water
- AHU-5 Kitchen Hood Exhaust System with make-up Air Unit

GEOHERMAL SYSTEM (GEO)

- GEO-1 Geothermal Heat Pump Loop Pumping System-Basic
- GEO-2 Geothermal Heat Pump Loop Pumping System with Closed Circuit Fluid Cooler Assistance
- GEO-3 Heat Pump Unit Connected to Geothermal Heat Pump Loop Piping

Updated 5/2018; updates are bold

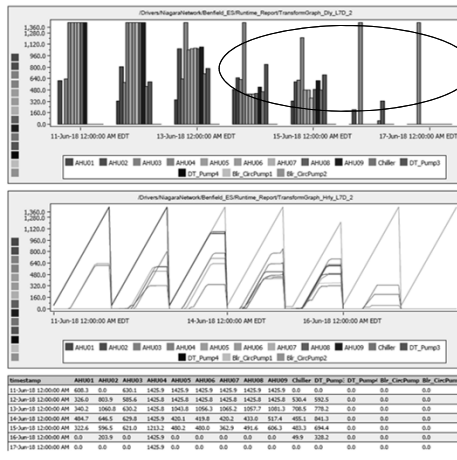
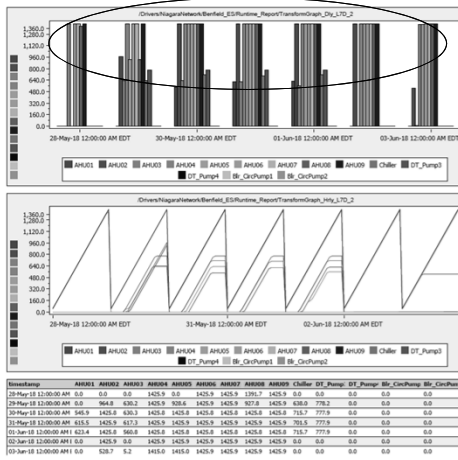
23 90 00 AUTOMATIC TEMPERATURE CONTROLS
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Updated 5/2018; updates are bold

Solutions Continued...Weekly Runtime Report

Before

After



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Solutions Cont'd...Weekly Override Report

Weekly report automatically emailed by BAS to outlook which has a macro to filter and sort...

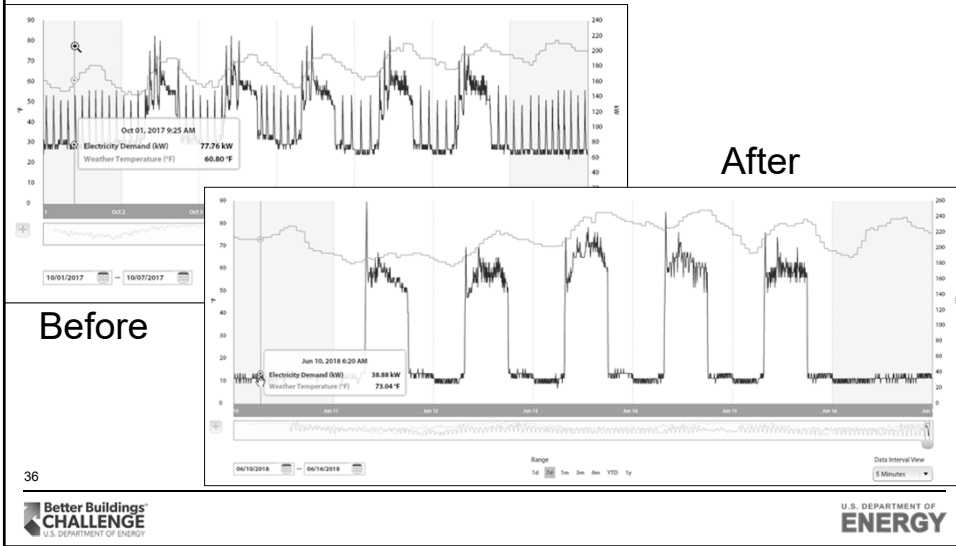
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4 AHJ35_Lobby	OCC-C	Occpd (override)	8	Occpd	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/AHJ35_Lobby/OCC524C
7 AHJ35_Auditorium	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/AHJ35_Auditorium/OCC524C
8 SC_UVem15_ScienceLecture_237	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/UVV/SC_UVem15_ScienceLecture_237/OCC524C
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10 SC_UVem17_ClassRM_339	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC200/UV/SC_UVem17_ClassRM_339/OCC524C
11 SC_UVem18_TeacherPlanningRM_337	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC200/UV/SC_UVem18_TeacherPlanningRM_337/OCC524C
12 SC_UVem18_Clothing	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC_UVem18_Clothing/OCC524C
13 SC_UVem18_TeacherPlanningRM_338	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC200/UV/SC_UVem18_TeacherPlanningRM_338/OCC524C
14 SC_UVem18_ScienceLab_302	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC200/UV/SC_UVem18_ScienceLab_302/OCC524C
15 SC_UVem17_TechAudioLab	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC_UVem17_TechAudioLab/OCC524C
16 SC_UVem19_ScienceLab_302	OCC-C	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/UVV/SC200/UV/SC_UVem19_ScienceLab_302/OCC524C
17 SAHUVAV_135_PrincipalOffice	OCC-Cmd	Occpd (override)	8	Occpd	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ15_VAVV/SAHUVAV_135_PrincipalOffice/OccCmd
18 SAHUVAV_7510_ResourceCenter_213	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7510_ResourceCenter_213/OccCmd
19 SAHUVAV_7511_MediaCenter	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7511_MediaCenter/OccCmd
20 SAHUVAV_7514_MediaCenter	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7514_MediaCenter/OccCmd
21 SAHUVAV_7515_MediaCenter	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7515_MediaCenter/OccCmd
22 SAHUVAV_7516_ComputerRM_230	OCC-Cmd	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7516_ComputerRM_230/OccCmd
23 SAHUVAV_7517_InstructionRM_224	OCC-Cmd	Unocc (down, state, override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7517_InstructionRM_224/OccCmd
24 SAHUVAV_7518_VolRM_228	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7518_VolRM_228/OccCmd
25 SAHUVAV_7522_CareerServices	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_7522_CareerServices/OccCmd
26 SAHUVAV_7523_Office	OCC-Cmd	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/VAV/AHJ79_VAVV/SAHUVAV_7523_Office/OccCmd
27 SAHUVAV_7524_Speech	OCC-Cmd	Unocc (override)	8	Unocc	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC13/points/VAV/AHJ79_VAVV/SAHUVAV_7524_Speech/OccCmd
28 SAHUVAV_754_ChoreMusic120	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC11/points/VAV/AHJ79_VAVV/SAHUVAV_754_ChoreMusic120/OccCmd
29 SAHUVAV_756_TeacherPlanning129	OCC-Cmd	Occ (Fail, Down, override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC11/points/VAV/AHJ79_VAVV/SAHUVAV_756_TeacherPlanning129/OccCmd
30 SAHUVAV_759_RenzellIRM_212	OCC-Cmd	Occ (override)	8	Occ	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/VAV/AHJ79_VAVV/SAHUVAV_759_RenzellIRM_212/OccCmd
31 CHS_DKL_3C	3UM-Win	Winter (override)	8	Winter	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC11/points/HTU_CU/CHS_DKL_3C/UMS250Win
32 CCCHV4B_RenRM_204	Unoccing	70.0 F (override)	8	70.0 F	slot/Drivers/NiagaraNetwork/BrooklynParkMS/AACS_BrooklynPAMS_NC12/points/UVV/SC_UVem19_ScienceLab_302/OccCmd

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Solutions Cont'd...Sequence Improvements

Several buildings were not programmed to require building occupancy in addition to OAT enable setpoint...thus night operation and cycling...



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Chiller Plant Enable Tabulated Results...

Measure Title	Building Name	Measure Type	Equipment Type	Status	Date Found	Date Implemented	Projected Savings - Cost
Chiller Plant Enable	Annapolis ES - Metasys	Control	Cooling Systems (Chillers)	Implemented	3/2/2018	3/2/2018	\$10,000
Chiller Plant Enable Logic	Marley MS - Tridium	Control	Cooling Systems (Chillers)	Implemented	5/1/2017	6/30/2017	\$10,000
Chiller Plant Enable Logic	Georgetown East ES - Tridium	Control	Cooling Systems (Chillers)	Implemented	7/5/2017	7/31/2017	\$2,420
Chiller Plant Enable Logic	Four Seasons - Tridium (previously Circon)	Control	Cooling Systems (Chillers)	Implemented	9/21/2017	11/2/2017	\$4,000
Chiller Plant Enable Logic	Southern HS - Tridium	Control	Cooling Systems (Chillers)	In Progress	8/28/2017	TBD	\$17,649
Chiller Plant Enable Logic	Arundel HS - Metasys JCI Lon	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$15,000
Chiller Plant Enable Logic	Oak Hill ES - Tridium	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Severn River Magdohy - Tridium (EBI-310 previously)	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$10,000
Chiller Plant Enable Logic	Davidsonville ES - Tridium (previously Metasys)	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Crofton ES - Tridium (previously Metasys)	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Brooklyn Park MS - Tridium Overlay of JCI	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Meade MS - Tridium overlay of JCI	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$10,000
Chiller Plant Enable Logic	Brook Bridge ES - Tridium overlay of EBI-310	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Sunset ES - Tridium overlay of EBI-310	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Van Bokkelen - EBI-410	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	Lindale MS - EBI-410	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$10,000
Chiller Plant Enable Logic	Nantucket ES - Transition from Circon to Tridium	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$5,000
Chiller Plant Enable Logic	North County HS - Legacy Honeywell	Control	Cooling Systems (Chillers)	In Progress	9/21/2017	TBD	\$15,000
						Projected Energy Savings -->	\$144,069

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Continuing Effort & Goals





- **Currently**
 - Leveraging BAS platforms to execute fundamental energy management practices and find additional efficiency opportunities
 - Retroactively implementing standardized ATC sequences where appropriate
 - Ex: Chiller Plant Enable, HW Plant Enable, OSS, etc.
 - Using real-time electric data in combination with BAS data to support M&V and business case
- **Goals**
 - Migrating each school to centralized platform
 - Increasing the number of facilities with real-time energy information
 - 2/5 of facilities have it
 - all HS's & MS's, some ES's
 - Integrate Lighting Control
 - Currently non-networked standalone systems managed at schools

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- **2018 Energy Exchange and Better Buildings Summit**
- August 21st-23rd in Cleveland, OH
- Registration is open!
- Highlights include:
 - Panel sessions and technical trainings (earn CEUs)
 - Peer-to-peer discussions
 - Ask-an-Expert/FEMP Lounge
 - Networking opportunities
 - Pre- and post-conference workshops
 - Better Buildings Partner sessions
 - Building Tours

For more information and to register:
2018energyexchange.com

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