Clean Energy for Low Income Communities Accelerator (CELICA) Online Toolkit
Clean Energy for Low Income Communities (CELICA): Outcomes

Partners successfully leveraged resources to commit up to $335 million to help 155,000 low income households access energy efficiency and renewable energy benefits, and demonstrated promising program models for:

**Single Family**

*Example: State of Connecticut* and CT Green Bank’s bundled energy efficiency and solar program has been so successful that solar PV systems are owned by households in low income communities as much as those in non-low-income areas.

**Multifamily Affordable**

*Example: District of Columbia* is incentivizing building owners to serve 100,000 low income households with 240-300MW solar PV.

**Low Income Community Solar**

*Example: State of Michigan* Energy Office’s low income community solar program partnered with utilities to deliver $350/yr in additional savings for participating, previously weatherized, low income households.
Launched - Low-income Energy Affordability Data (LEAD) Tool

Goal: Help stakeholders make data-driven decisions on energy goals and program planning by improving their understanding of low income and moderate income household energy characteristics.

https://www.energy.gov/eere/slsc/maps/lead-tool
Speakers

- **Alison Donovan**, Vermont Energy Investment Corp (VEIC)
- **Kara Brooks**, American Society for Healthcare Engineering (ASHE)
- **Kimberly Joseph**, Bullitt County Public Schools, KY
- Moderator: Pam Mendelson, DOE
Zero Energy Modular Initiative
An Affordable Housing and Economic Development Opportunity for Rural Communities

Alison Donovan
About VEIC

• Nonprofit founded in 1986
• 300+ Employees
• Locations: VT, DC, OH, NY
• Design, deliver, and evaluate programs nationwide:
  • Energy efficiency
  • Transportation
  • Renewable energy

Our Customers:
• Utilities
• Businesses
• Government
• Foundations
• Environmental & Consumer Groups
Agenda

• What is Rural?
• Characteristics of Rural America
• VEIC’s Zero Energy Modular Initiative
• ZEM Case Studies
What is Rural? Not Urban.

Census Bureau
- Urbanized Areas (UAs) >50,000 people
- Urban Clusters (UCs) 2,500 < 50,000 people
- 60 million people or 19% of population rural
- 95% land considered rural

Office of Management and Budget
- Metropolitan >50,000 people
- Micropolitan 10,000 < 50,000 people
- 46 million people or 15% of population rural
- 72% land considered rural

US Dept Agriculture Rural Development
- Use Census or OMB definitions depending on activity

Source: https://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural.aspx
Rural Household Characteristics

- Single Family Homes
- Older Housing
- Aging Population
- Lower Income
- Economy Dependent on Manufacturing

Reference: ACEEE The High Cost of Energy in Rural America
Images: Shutterstock, National Debt Relief.com

 VEIC
Energy Burden

The percent of total household income that goes towards home energy bills

- Rural households have higher energy burden than urban
- Rural renters have higher energy burden than owners
- Residents of rural manufactured housing have highest energy burden

Reference: ACEEE The High Cost of Energy in Rural America

Photo Credit: VT Fuel Dealers
Mobile and Manufactured Homes Percent of all Housing by State

Source: 2016 American Community Survey 5-Year Estimates, US Census Bureau
VEIC’s Zero Energy Modular Initiative
FROM A NATURAL DISASTER...
A MODULAR SOLUTION
Zero Energy Modular Homes

QUALITY
• Modular construction
• Healthy materials
• Fresh air ventilation
• Low maintenance

EFFICIENCY
• High-efficiency equipment
• Super-insulated envelope
• All-electric
• Solar PV

FLEXIBILITY
• Mobile home replacement
• Urban infill
• New developments
WHY ZEM?

ZERO ENERGY HOMES + MODULAR CONSTRUCTION = AFFORDABLE OWNERSHIP
CREATE DEMAND FOR AND CAPACITY TO BUILD ZEM HOMES

MODULAR FACTORY

- Transform the construction industry
- Decarbonization at scale
- Jobs and economic development

ZEM HOMES

- All electric and solar PV
- Reduced energy burden
- Affordable & healthful
REQUIREMENTS FOR ZEM ADOPTION AT SCALE

**AFFORDABLE LAND**
Innovative ownership structures such as co-op and land trust, urban infill and "zombie" developments

**MARKET SUPPORTS**
Net metering, favorable financing, incentives for energy efficiency and renewable energy, green home appraisers, and certified home energy raters

**DEMAND FOR ZEM HOMES**
Can be created by partners such as co-operative communities, energy efficiency programs, and affordable housing advocates

**MODULAR FACTORY**
Willing and able to capable of incorporating, or willing to learn, passive house and zero energy design and building techniques into their construction practices
ZEM RESOURCES & CASE STUDIES
ZEM Factory
Business Plan Toolkit

Made possible through with generous support from
The New York Community Trust

Photo of Huntington Homes, VT
ZEM Factory Layout Options

SMALL FACTORY OPTIONS
- “Crib”, or “Bay” construction works well for a start-up.

MEDIUM AND LARGE FACTORY OPTIONS
- If higher volume, line production can increase efficiency and reduce costs.
Lean Manufacturing

GUIDING PRINCIPALS

• Reducing Waste
• TAKT Time
• Efficient Production

“TAKT” time is the average factory cycle time per module (hours/module, as an average of standard models produced at the factory):

Available Time for Production / Required Units of Production = Takt Time.
Factory Job Types

MANAGEMENT
• General manager
• CFO
• HR director
• Accounts payable and receivable manager
• Purchasing manager
• Engineering manager/QA
• Production manager
• Designer

LABOR
• Carpenter
• Electrician
• Plumber
• Drywall
• Cabinetmaker
• Painter
• Roofer
# ZEM Factory Estimated Set-Up Costs

<table>
<thead>
<tr>
<th>Factory Parameters</th>
<th>20-40,000 sq. ft</th>
<th>20-45,000 sq. ft</th>
<th>70-100,000 sq. ft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-70 modules/yr</td>
<td>70-160 modules/yr</td>
<td>250-360 modules/yr</td>
</tr>
</tbody>
</table>

| Equipment Costs Subtotal | $452,000 | $793,800 | $1,400,000 |
| Building Set-up Subtotal | $135,450 | $445,700 | $967,500 |
| Prototype home cost | $150,000 | $150,000 | $150,000 |
| Total | $737,450 | $1,389,500 | $2,521,500 |

The costs presented below assume all new equipment, costs could be reduced by up to 40% by acquiring used equipment from idle or closing plants. Equipment costs will also vary regionally.
Download the Full Manual
ZEM Factory Manual- Business Plan Toolkit

https://www.veic.org/resource-library
Vermont ZEM Program

PARTNERS
- Efficiency Vermont
- Vermod
- High Meadows
- Vermont Housing and Conservation Board
- Champlain Housing Trust
- Network of affordable housing developers

PROGRESS TO DATE
- >100 homes installed
- Over a $1 million in homeowner energy bill savings
McKnight Lane

BACK-UP BATTERY PILOT

- VEIC, Clean Energy States Alliances, High Meadows Fund, and Green Mountain Power purchase and install battery storage
- Back-up battery powers critical loads during a grid outage
- Green Mountain Power draws on batteries to lower peak electric load

PARTNERS

- Developed by Addison County Community Trust in partnership with Cathedral Square Corporation
- Designed for low-income rental housing with eligibility based on 60% of AMI

SITE PLAN

- 7 duplexes with 14 two- and three-bedroom homes
- 2 homes are ADA wheelchair accessible
- Common outdoor space

VEIC
ZeMod Delaware Pilot

SPONSORED BY ENERGIZE DELAWARE

- Goal to install 25 ZEM homes

IMPLEMENTATION TEAM

- Milford Housing Development
- Beracah Homes
- VEIC

PROGRESS TO DATE

- Two ZEM model homes
- One owner occupied ZEM home
- 20 unit ZEM development in planning
First Owner Occupied ZeMod

<table>
<thead>
<tr>
<th>Zero Energy Modular</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Envelope</strong></td>
</tr>
<tr>
<td>Floor</td>
</tr>
<tr>
<td>Walls</td>
</tr>
<tr>
<td>Windows</td>
</tr>
<tr>
<td>Ceiling</td>
</tr>
<tr>
<td>Infiltration</td>
</tr>
<tr>
<td><strong>Mechanicals</strong></td>
</tr>
<tr>
<td>Heating</td>
</tr>
<tr>
<td>Cooling</td>
</tr>
<tr>
<td>Hot Water</td>
</tr>
<tr>
<td>Duct Leakage</td>
</tr>
<tr>
<td>Ventilation</td>
</tr>
<tr>
<td><strong>Lights &amp; Appliances</strong></td>
</tr>
<tr>
<td>Efficient Lighting</td>
</tr>
<tr>
<td>Appliances</td>
</tr>
<tr>
<td><strong>Renewable Energy</strong></td>
</tr>
<tr>
<td>Solar PV</td>
</tr>
</tbody>
</table>
Zero Energy Modular Affordable Housing Initiative

SPONSORED BY MA DOER
• Goal to install 10 ZEM homes as NC and mobile home replacement
• VEIC program manager

PARTNERS
• Pioneer Valley Habitat for Humanity
• Vermod
• PV Squared
• CDI

PROGRESS TO DATE
• Two homes installed Oct 2018
• Homeowner and volunteers completing homes
• Occupancy expected in fall of 2019
## Pioneer Valley Habitat for Humanity Estimated Homeowner Economics

<table>
<thead>
<tr>
<th></th>
<th>Monthly Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgage</td>
<td>$635</td>
</tr>
<tr>
<td>Energy</td>
<td>$20</td>
</tr>
<tr>
<td>Total Monthly Costs</td>
<td>$655</td>
</tr>
<tr>
<td>Annual Income Required</td>
<td></td>
</tr>
<tr>
<td>(housing cost as 30% of income)</td>
<td>$32,208</td>
</tr>
</tbody>
</table>

![Cumulative Monthly Cash Flow](cumulative_monthly_cash_flow.png)

*Note: The graph shows the cumulative monthly cash flow for the housing assistance rate at retail NMC.*
CONSIDERATIONS FOR ZEM ADOPTION AT SCALE

CODES AND REGULATIONS
Factory construction presents the opportunity for better code enforcement. Is there a way to adopt national standards?

FACTORY ENGAGEMENT
If a factory always built to the most stringent code standard, would they save enough time to make up for the additional cost of materials?

UNIFORM HOME DESIGNS
Create programs that aggregate demand, standardize design, and optimizing size for modules.

FINANCING
Homeowners and developers need financing packages that meet modular payment and contracting schedules.
Thank you!

Alison Donovan
adonovan@veic.org
Kara Brooks, LEED AP BD+C
Sustainability Program Manager, ASHE
kbrooks@aha.org
Office: 312-422-3813
1. Glimpse of Rural Health Care in US
2. Energy Expenditures in Hospitals
3. ASHE’s Energy to Care Program
4. Rural Health Care Case Studies
Glimpse of Rural Health Care in US
Definition of a Closed Hospital

We follow the convention of the Office of Inspector General that a closed hospital is “A facility that stopped providing general, short-term, acute inpatient care [.....] We did not consider a hospital closed if it: Merged with, or was sold to, another hospital but the physical plant continued to provide inpatient acute care, Converted to critical access status, or Both closed and reopened during the same calendar year and at the same physical location.”

University of North Carolina
Cecil G. Sheps Center for Health Services Research
2005 to Current – Rural Hospital Closures
Rural Hospital Closure Overview

“Closures have been ticking up since the recession of 2008-2009. There are likely multiple contributing factors, including failure to recover from the recession, population demographic trends, market trends (e.g. increased rates of merger and affiliation), decreased demand for inpatient services, and new models of care (e.g. Accountable Care Organizations). Long-standing trends – such as generally poorer financial performance in the South – may contribute to closure rates. Some observers have noted the potential effect of the Affordable Care Act (“Obamacare”) and/or the correlation with a state’s decision of whether to expand Medicaid.”

University of North Carolina
Cecil G. Sheps Center for Health Services Research
Rural Hospitals at Risk of Financial Distress
Energy Expenditures in Hospitals
Hospital O & M Budget

Cut Btu’s
Not FTE’s!
Health Care and Energy Quiz

One dollar of energy savings is worth about $20 in revenue.

• At a 5% Operating Margin for every $1 in gross revenue
  – $0.95 is required to cover the expense of providing services
  – $0.05 is left to fund other expenses
Health Care and Energy Quiz

Impact of the Operating Margin

<table>
<thead>
<tr>
<th>Operating Margin</th>
<th>For Each Revenue Dollar To Cover Exp/Avail $’s</th>
<th>Amount of Revenue to Generate $1</th>
</tr>
</thead>
<tbody>
<tr>
<td>7%</td>
<td>$0.93 / $0.07</td>
<td>$15</td>
</tr>
<tr>
<td>5%</td>
<td>$0.95 / $0.05</td>
<td>$20</td>
</tr>
<tr>
<td>2%</td>
<td>$0.98 / $0.02</td>
<td>$50</td>
</tr>
</tbody>
</table>

The smaller the operating margin, the greater value of each dollar saved!
2014 – Operating Margin

*Moodys Investors Service, "U.S. Not-for-Profit Hospital 2014 Medians" report, shows a median operating margin of 2.6%.*


<table>
<thead>
<tr>
<th>Operating Margin</th>
<th>For Each Revenue Dollar To Cover Exp/Avail $’s</th>
<th>Amount of Revenue to Generate $1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6%</td>
<td>$0.974 / $0.026</td>
<td>$38.46</td>
</tr>
</tbody>
</table>
Energy Use in Healthcare

Median EUI per Property Type

* From Energy Star Portfolio Manager Technical Reference – U.S. Energy Use Intensity by Property Type

© 2018 American Society for Health Care Engineering
ASHE’s Energy to Care Program
Background

American Society for Health Care Engineering (ASHE)

- Professional Membership Group of the American Hospital Association
- Sustainability Program

Goal of Program - empower hospitals to put resources back into patient care through *Operational Excellence*

www.energytocare.org
Energy to Care Program History

• Originally established in 2006 as the Energy Efficiency Commitment (E2C) Program
• Two product lines – Energy to Care, Sustainability Roadmap
• **Energy to Care** - Free benchmarking and awards program **monitor**, **reduce**, and **communicate** energy consumption:
  - Benchmark energy use using a dashboard tool
  - Recognition for efficiency accomplishments
  - How-To Guides
  - Peer-to-Peer comparison on energy efficiency and reduction efforts
Energy to Care Product Lines

Energy to Care Dashboard Tool

You Can’t Manage What you Don’t Measure!

Education

Looking for ways to reduce costs? Download ASHE's NEW publication which includes summaries, tips, tactics, and case studies to help facilities reduce energy use regardless of their size or climate zone.

Energy to Care Treasure Hunt Program

Awards and Challenges

© 2018 American Society for Health Care Engineering
Current Energy to Care Participation

ENERGY TO CARE PARTICIPATION

- Totals
- Linear (Inpatient)
- Linear (Outpatient)
- Linear (Totals)


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Since 2010, hospitals and health care facilities participating in ASHE's Energy to Care program have put more than $430 million dollars in energy savings back into patient care.
Environmental – Total Program Savings

- **Greenhouse gas emissions from:**
  - 915,570 passenger vehicles driven for one year
- **CO2 emissions from:**
  - 516,386 homes’ energy use for one year
- **Carbon Sequestered from (carbon dioxide removed from atmosphere and held):**
  - 71,305,392 tree seedlings grown for 10 years
Social – Total Program Savings

Total program savings of $430,680,269 translates to the equivalent of health insurance premiums for 1 year for 91,323 individuals.

Average yearly savings of $43,933,644 translates to the equivalent of health insurance premiums for 1 year for 10,147 individuals.

Based on 2017 Average individual insurance premium (without subsidies) = $393/month, $4,716/year.
Rural Health Care Case Studies
Russell Regional Hospital

Location – Russell, Kansas
Size – 98,000 GSF
Number of Staffed Beds - 25

© 2018 American Society for Health Care Engineering
Game Plan?

The Game Plan Russell Regional’s game plan to save operating expense was simple:

- Make small improvements to start
- Earn trust by managing with energy in mind
- Invest in opportunities to reduce energy and improve the facility
- Sustain the gains
Energy Conservation Measures Identified

Table 1 Select energy conservation measures annual savings, project cost, and simple payback.

<table>
<thead>
<tr>
<th>Energy Conservation Method</th>
<th>Total Annual Savings (Energy + O&amp;M)</th>
<th>Project Cost</th>
<th>Simple Payback (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting improvements</td>
<td>$21,146</td>
<td>$95,528</td>
<td>4.5</td>
</tr>
<tr>
<td>Water efficiency improvements</td>
<td>$1,889</td>
<td>$16,739</td>
<td>8.9</td>
</tr>
<tr>
<td>Energy management system upgrades</td>
<td>$24,147</td>
<td>$264,556</td>
<td>11.0</td>
</tr>
<tr>
<td>Boiler replacement (convert to hot water)</td>
<td>$33,233</td>
<td>$474,679</td>
<td>14.3</td>
</tr>
<tr>
<td>Chiller replacement</td>
<td>$19,773</td>
<td>$301,401</td>
<td>15.2</td>
</tr>
<tr>
<td>Condensing unit replacement</td>
<td>$12,611</td>
<td>$63,222</td>
<td>5.0</td>
</tr>
<tr>
<td>Variable speed pumping</td>
<td>$10,244</td>
<td>$39,037</td>
<td>3.8</td>
</tr>
<tr>
<td>Floating head pressure controls</td>
<td>$656</td>
<td>$2,452</td>
<td>3.7</td>
</tr>
</tbody>
</table>
Russell Regional Hospital has an ENERGY STAR score of 100 which means that it performs better than all of its peer facilities. In this sense, the results have been fantastic. The facility reduced energy use by a spectacular 43 percent between 2013 and 2016.
The energy project made a real difference for the hospital. "That’s the whole Energy to Care idea, right?" suggests Steve. “Reducing some of our operating expenses helps us focus on our primary mission of taking care of patients!”
Conway Regional Hospital

Location - Conway, Arkansas
Size - 405,152 GSF
Number of Staffed Beds - 150

1956 originally built

© 2018 American Society for Health Care Engineering
ASHE Energy to Care Treasure Hunt

Participate in an Energy Treasure Hunt!

Participants learn to identify low cost/no cost measures for efficiency as well as Capitol Measures.

Treasure Hunts result in a culture change geared toward efficiency.

Engage layers of personnel

© 2018 American Society for Health Care Engineering
Train the Trainer Educational Program

Key Learning Objectives

- **Adopt** a culture of continuous improvement to reduce energy consumption and cost
- **Identify** no- and low-cost energy savings opportunities
- **Engage** and train hospital staff from all departments
- **Create** facility action plans
- **Establish** and assign project implementation responsibilities
Opportunities Identified

## Energy Savings Opportunities

### Summarized Potential Projects

#### Central Plant
- Boiler Sequence of Control - Staging

#### Exterior-Entryway
- Time clocks or photocells can keep lights off during unnecessary daytime hours.

#### General
- Providing outside air to meet CO2 minimums
- Create a Green Team
- Use ENERGY STAR-labeled products
- Remove Manual holds as soon as the special circumstance is complete
- Keep lights off and ensuring the cleaning crews aren’t causing areas to become active for entire nights can limit their impact on the energy consumption.
- Post visual reminders throughout the hospital to keep energy and sustainability “top of mind”
- Install LED lights throughout the facility

- Create a policy of temperature set points that is consistent throughout the facility

#### Hallways
- Avoid over-conditioning hallways

#### Mechanical Rooms
- Verify if air compressors operating and are required.
- Eliminate duct leakage

#### Office Areas
- Ensure thermostats are set to a reasonable seasonal temperature.
- Remove space heaters.
- Utilize Occupancy sensors can help keep lights off when not required.
- Investigate drafty areas near windows.
- Utilize central refrigerators in areas and remove multiple mini-refrigerators.
Total Savings Identified

Arkansas Association for Healthcare Engineering, Inc. – Conway Regional Health System

$500,000 ANNUAL SAVINGS OPPORTUNITIES
“The ASHE Energy to Care Treasure Hunt was an invaluable process for us. Like most hospitals, Conway Regional Medical Center strives to attain a balanced compromise between thermal comfort and energy efficiency. For our facility and our staff, it almost always comes down to cultural and behavioral change. For example, after one quick walk through our administrative offices, we noticed individual space heaters which were competing against the supply air temperature. Creating a policy to eliminate the space heaters and adjust the temperature to an acceptable setpoint would result in an annual electricity cost savings of over $12,000. That’s a significant difference considering one small change! Every dollar saved through sustainability measures enables us to reallocate those resources and better serve our community by providing high-quality, compassionate health care services.” –Eric Kindsfater
“After discussing and reviewing all the opportunities discovered during the Treasure Hunt, it’s evident that behavior change must resonate from leadership to truly engender a “green” or sustainable minded culture. The experience was eye opening, and I’m grateful to ASHE and AAHE for organizing the Treasure Hunt at Conway Regional Medical Center. We are always seeking opportunities to improve, and now we have a list of improvement projects that we can implement immediately with little or no cost.” -- Bryan Gibbs
Thank you!

Feel free to visit [www.energytocare.org](http://www.energytocare.org) for more info and more case study references.

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155 N. Wacker Drive, Suite 400 | Chicago, IL 60606
ashe.org | ashe@aha.org | 312-422-3800
Kimberly Joseph
Bullitt County Public Schools, KY
Bullitt County Public Schools

Energy Management: K-12 Schools

July 10, 2019

DOE Better Buildings Summit
Bullitt County Public Schools

- Seventh largest school district in Kentucky
  - 13,000+ students
- 23 school facilities
  - 3 High schools
  - 1 Alternative Campus
  - 6 Middle Schools
  - 13 Elementary Schools
- 4 Administrative buildings
- 2000 Employees (classified & certified)
Why Energy Management?

- K-12 schools spend $10 billion on energy costs each year.
- 30% of energy consumed in commercial buildings is wasted.
- Estimated that at least $3 billion can be saved through implementing energy efficiency measures.
- Energy efficiency: frees up resources, improved IAQ, and healthy learning environment.
BCPS and Energy Management

- 2006: started program with the Kentucky Energy Efficiency Program for Schools (KEEPS)
  - ENERGY STAR Guidelines for Energy Management
  - ENERGY STAR Partner
  - Hiring an energy manager
  - Utilities – tracking costs and usage, rates and tariffs
  - Low-cost and no-cost actions
  - Building awareness
  - Passing a policy and plan
BCPS and Energy Management

- 2008: addressed capital improvements, leading to an energy savings performance contract (ESPC)
  - 5 HVAC system replacements
  - Updating and upgrading OAU and MAU units
  - Centralized building automation system
  - 19 buildings received new HVAC controls
  - Lighting upgrades
  - VFDs and isolation valves
Kentucky Schools – Energy Management

- 2009/2010 – ARRA funds
  - KY Energy and Environment Cabinet
  - University of Louisville - KPPC/KEEPS
  - KY School Board Association (KSBA)
- 2012 – 2018
  - KSBA utilizes utility funding for School Energy Manager Program (SEMP)
BCPS Energy Program

- District level participation and support
- Monthly tracking of utility usage and costs
- Non-school hour energy conservation
  - Shutdowns over long weekends, breaks
  - Temperature setbacks (unoccupied settings)
- Student and staff education and awareness
- Student energy teams
  - NEED (National Energy Education Development Project)
  - Kentucky Green & Healthy Schools
Better facilities and maintenance practices
Team involvement in new construction and renovation
Improved HVAC filter program
Monitoring of HVAC systems and IAQ
Single stream recycling
Water conservation
2018 ESPC
Energy Management Success

Energy Use Compared to District Growth

- **ft²**
- **kBtu**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Building Area (ft²)</th>
<th>kBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/05</td>
<td>1,200,000</td>
<td>0</td>
</tr>
<tr>
<td>05/06</td>
<td>1,300,000</td>
<td>0</td>
</tr>
<tr>
<td>06/07</td>
<td>1,400,000</td>
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<td>07/08</td>
<td>1,500,000</td>
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<td>08/09</td>
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<td>09/10</td>
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<td>10/11</td>
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<td>11/12</td>
<td>1,900,000</td>
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<td>15/16</td>
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<tr>
<td>16/17</td>
<td>2,400,000</td>
<td>0</td>
</tr>
<tr>
<td>17/18</td>
<td>2,500,000</td>
<td>0</td>
</tr>
</tbody>
</table>
## BCPS – Energy Comparison

<table>
<thead>
<tr>
<th>Utility Type - Usage</th>
<th>2006/2007</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric (kWh)</td>
<td>25,286,477</td>
<td>19,750,114</td>
</tr>
<tr>
<td>Natural Gas (ccf)</td>
<td>328,762</td>
<td>139,692</td>
</tr>
<tr>
<td>Propane (Gal)</td>
<td>24,321</td>
<td>0</td>
</tr>
<tr>
<td>Total Energy (kBtu)</td>
<td>122,365,317</td>
<td>81,775,665</td>
</tr>
<tr>
<td>Water/Sewer (Gal)</td>
<td>28,696,410</td>
<td>20,159,630</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Utility Type - Cost</th>
<th>2006/2007</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric (kWh)</td>
<td>$ 1,878,962</td>
<td>$ 2,205,925</td>
</tr>
<tr>
<td>Natural Gas (ccf)</td>
<td>$ 326,271</td>
<td>$ 147,034</td>
</tr>
<tr>
<td>Propane (Gal)</td>
<td>$ 40,337</td>
<td>$ -</td>
</tr>
<tr>
<td>Total Energy (kBtu)</td>
<td>$ 2,245,570</td>
<td>$ 2,352,959</td>
</tr>
<tr>
<td>Water/Sewer Cost</td>
<td>$ 166,568</td>
<td>$ 219,438</td>
</tr>
</tbody>
</table>

| Total Building Area (ft²) | 1,600,859 | 2,039,528 |
Results and Recognition

- 2017/2018 school year: $931,491
- Energy Program Total Savings (2006 – Present) = Over $7 million
- 19 ENERGY STAR certified buildings
- ENERGY STAR POY in 2016 and 2019
- Better Buildings Showcase Building
  - 32% energy savings
  - $28,000 annual savings
Thank You
Thank You

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