



# Existing Buildings and the Path to Zero

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DIVISION OF  
CAPITAL ASSET  
MANAGEMENT &  
MAINTENANCE

# What is DCAMM?



Facilities Planning

Project Delivery

Property Management

Real Estate Services

Access & Opportunity

Contractor Services

**We work with state agencies** to create and manage forward-thinking, sustainable buildings to meet the needs of the Commonwealth's citizens and help achieve a zero-carbon future.

**We are partners with fellow agencies** to help them meet their strategic needs with fiscally responsible building and real estate solutions.

**We support the growth of the Commonwealth's economy** and actively engage with private sector partners to make it easier to do business with the Commonwealth.

**We work to expand access, opportunity and equity** to create more inclusive services, planning and outcomes for all the citizens of the Commonwealth.  
SQ footage



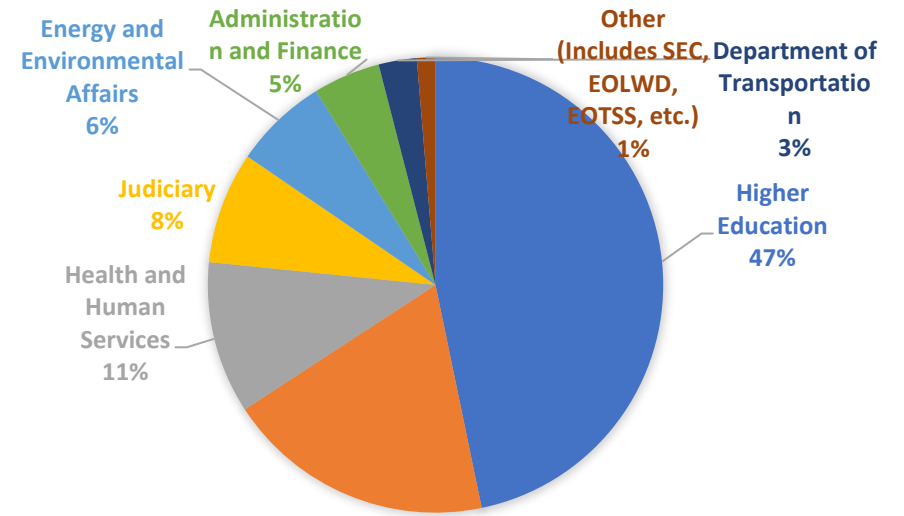
# What is DCAMM:

## By the Numbers:

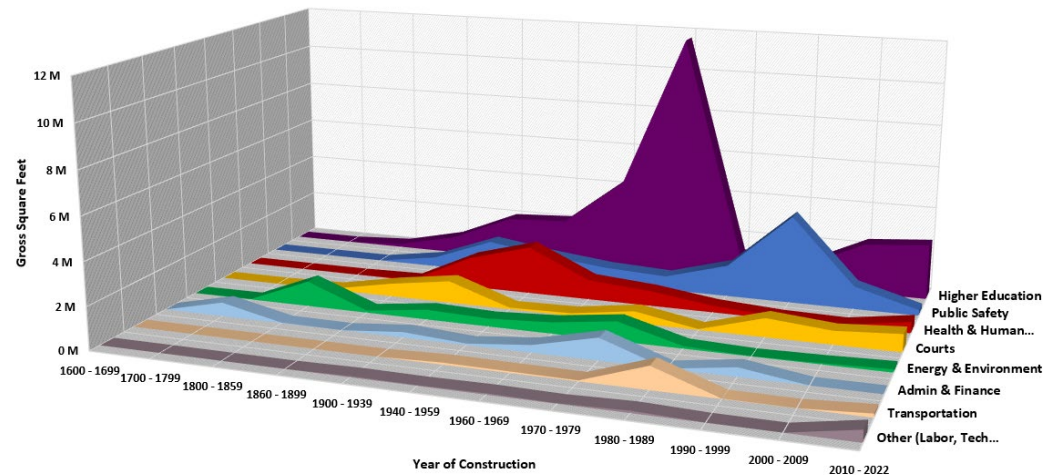
- Buildings Built: 1700- 2023
- GSF: ~61M

## Oversight:

- We do projects
- We delegate projects
- We maintain 5% of total sq ft



Active Major State Building Portfolio by Year of Construction (gross square feet)



# DCAMM- Energy and Sustainability Group

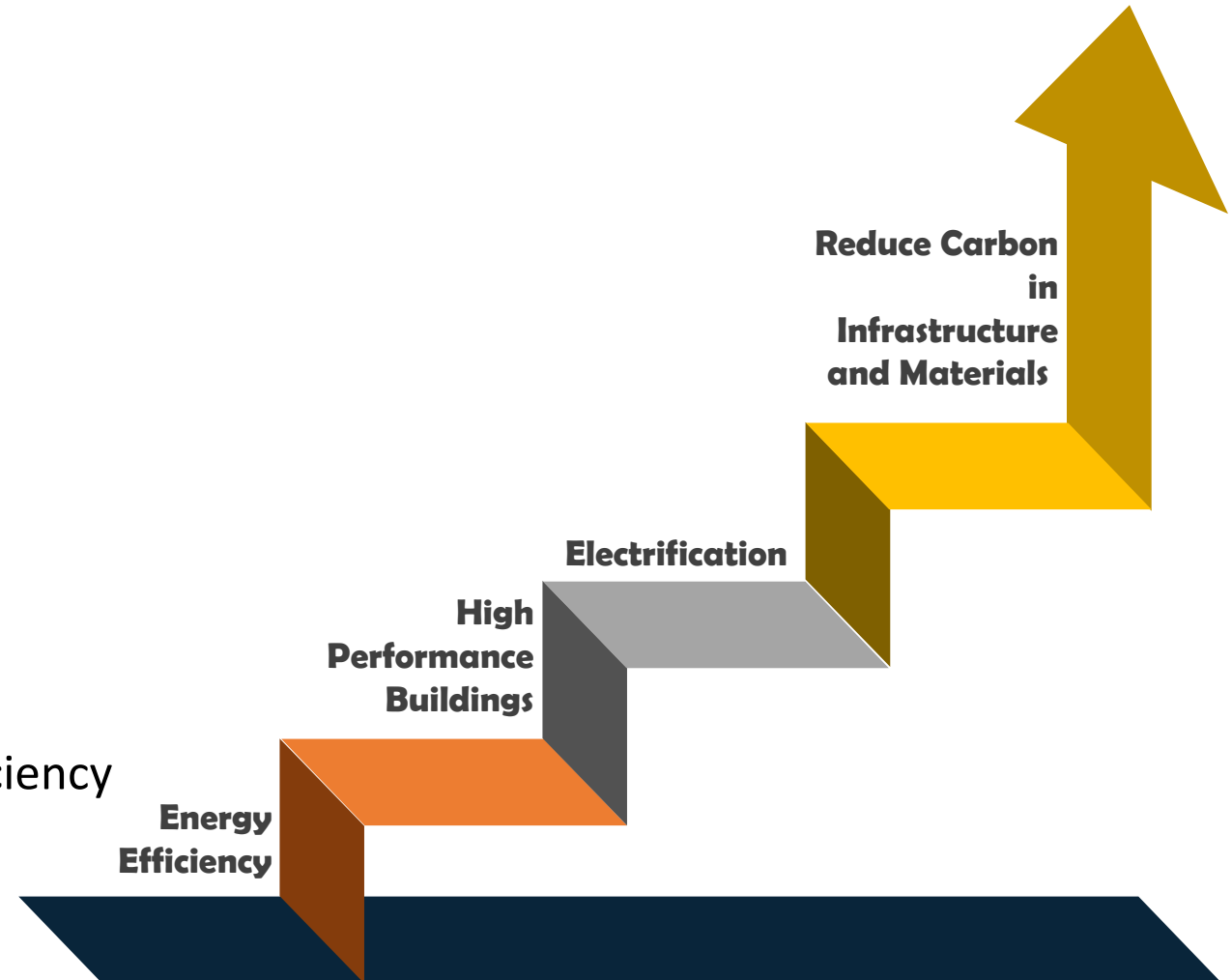
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## Energy and Sustainability Program Goals:

- Reduce greenhouse gas emissions
- Increase efficiency
- Save energy and water (and money)
- Construct better, more resilient buildings

## Program Focus:

- Eliminate fossil fuels
- Include resilience in every project
- Renew and electrify infrastructure
- Continue to utilize data driven approach
- Support knowledge at the facility level
- Assist facilities with ongoing operational efficiency



# Energy and Sustainability Group: Low hanging fruit, long term strategy

## Capital Energy Projects

Large: Comprehensive  
Small: Utility Vendor

## Energy Intelligence and Optimization

Real-time data collection (CEI)  
Commissioning and monitoring

## Electric Grid Programs

Demand Response  
Renewable/alternative energy credits

## Advise and collaborate

Resilience  
LEED and high-performance buildings  
Partner with agencies

### **M.G.L. c. 25A: DCAMM Energy Projects**

Pursuant to M.G.L.c. 25A, DCAMM awards contracts to the offeror that demonstrably possesses the skill, ability and integrity necessary to perform faithfully energy management services.



# Diverse Funding Sources

- Clean Energy Investment Program (CEIP)
- Utility incentives
- Energy credits
- Bond funding
- Grants
- PPAs



## Clean Energy Investment Program Overview

### Summary

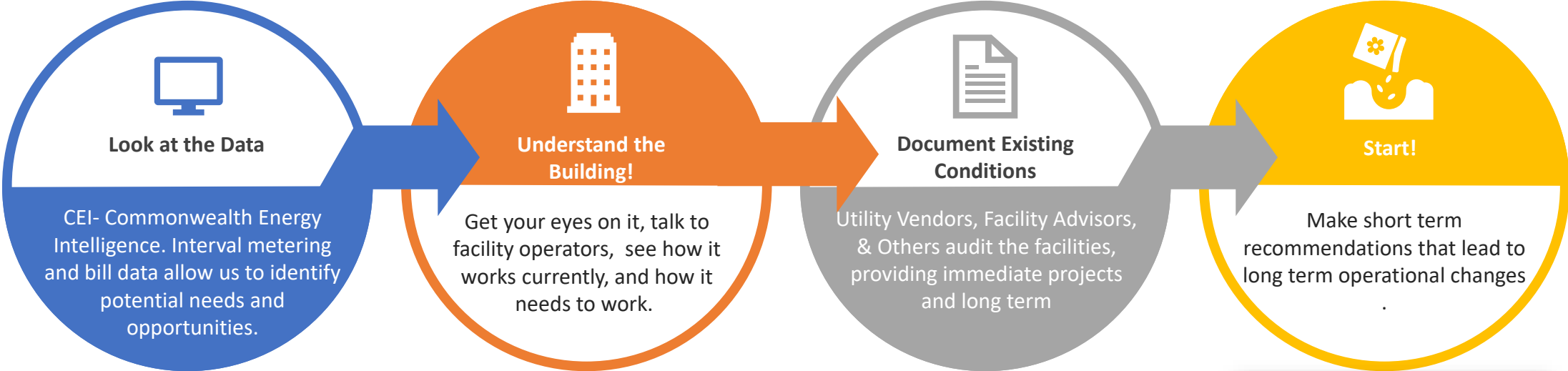
- Clean Energy Investment Program (CEIP) is a financing mechanism that uses project savings to repay capital costs.
- CEIP funding is “off cap” allowing access to funds without hitting debt ceiling limits.
- Client agency pays CEIP debt service from energy savings.
- Client agency signs Non-Financial ISA with DCAMM to commit to paying debt service.

### Background

Established in 2010 by the Executive Office for Administration and Finance (A&F) and the Division of Capital Asset Management and Maintenance (DCAMM), CEIP is an energy and water efficiency financing program, outside of the “bond cap,” for projects that save enough to pay the debt service on the related bonds. A&F reviews each project with DCAMM to ensure that savings and cost avoidance from reduced energy and water usage are sufficient to cover debt service for project costs. Using savings achieved from reduced consumption to pay for the projects ensures that the bonds will be self-supporting and therefore eligible to be outside the bond cap (and A&F’s Debt Affordability Policy).

The financing package has the characteristics of a lease between the client agency and DCAMM, requiring savings to repay capital costs and an independent verification of savings at the agency level. The annual CEIP debt service payment is required to be lower than the savings or cost avoidance amount in the original contract. The payment itself is made through a budgetary appropriation within the Office of the State Treasurer and Receiver General. The CEIP debt service for bonds will be paid from the Treasurer’s Office.

# Data-driven project delivery



**Look at the Data**

CEI- Commonwealth Energy Intelligence. Interval metering and bill data allow us to identify potential needs and opportunities.

**Understand the Building!**

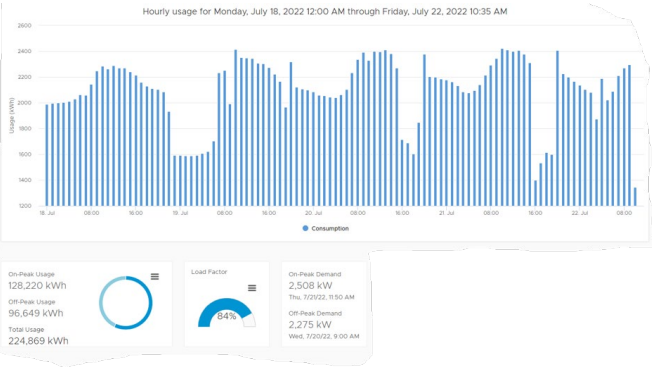
Get your eyes on it, talk to facility operators, see how it works currently, and how it needs to work.

**Document Existing Conditions**

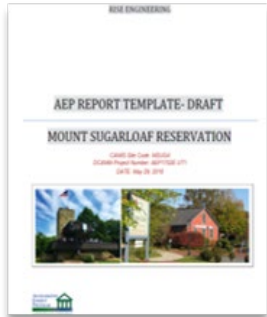
Utility Vendors, Facility Advisors, & Others audit the facilities, providing immediate projects and long term

**Start!**

Make short term recommendations that lead to long term operational changes



DESCRIPTION	FLOOR	INDICATED COMPLETE YR	ANNUAL COST	DESCRIPTION
Mechanics	20	9	\$10,000.00	Mechanics - 1000 Series
Lighting	20	9	\$10,000.00	Lighting - 1000 Series
Public Safety	20	9	\$10,000.00	CPU Room
ASG	20	9	\$10,000.00	ASG - CPU Room
ASG	14	9	\$10,000.00	ASG - Telephone
Audio/Vis	14	9	\$10,000.00	Audio/Vis - CPU Room 1000
Security/IT Room	10	9	\$10,000.00	Security/IT Room - 1000 Series
IT Room	14	14	\$10,000.00	CPU Room
Teacher Resource	14	14	\$10,000.00	Education - CPU Room 1000
Disability	14	9	\$10,000.00	CPU Room
MIS	14	9	\$10,000.00	CPU Room
DBS	14	9	\$10,000.00	DBS - CPU Room
Computer	9	9	\$10,000.00	CPU - 1000
ITD	9	9	\$10,000.00	1000 Series ITD 1000
IT Room	9	9	\$10,000.00	CPU Room
MCAD	9	9	\$10,000.00	CPU Room
DBS	9	9	\$10,000.00	1000 Series DBS 1000
Hardware	9	9	\$10,000.00	1000 Series Hardware 1000
TOTAL	140		\$800,000.00	



# Challenges of Retrofits...

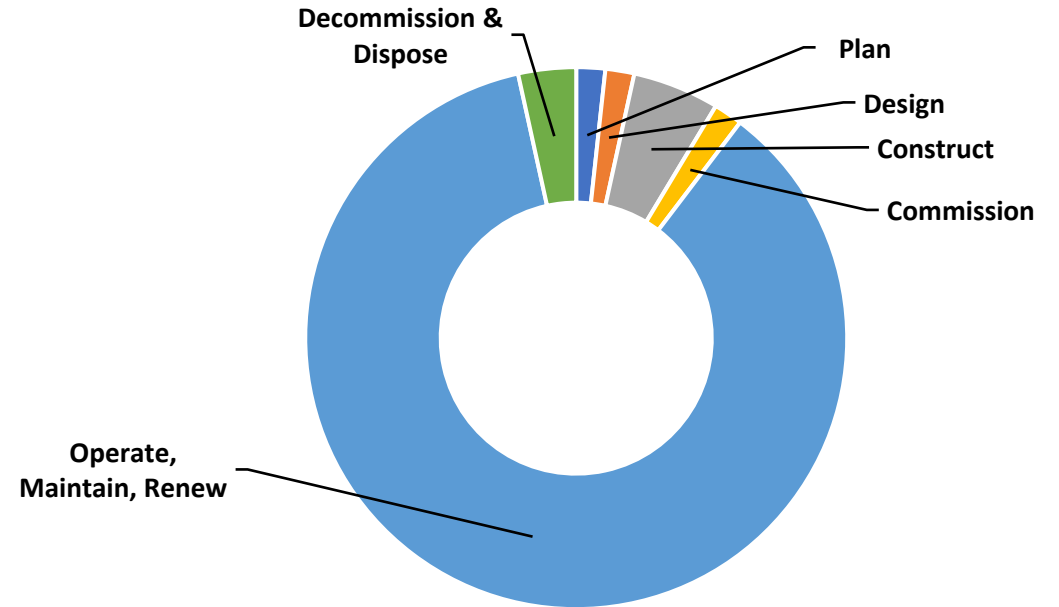
*What's behind that wall?*

*It's not working, so we shut it off.*

*How do we use it?*

*We can look at that in the future...*

1. Identify and quantify efficiency opportunities.
2. Specify highest efficiency equipment.
3. Eliminate oil, if possible look to reduce/eliminate other fuel uses. Make a plan for future removal/switching.
4. Train of facility staff, existing maintenance contracts that will be affected, or new maintenance contracts that will be required.
5. Look at resilience! If the project location is susceptible to threats- flooding, high heat, etc. can we do something to address it?





# Historic ECM Focus: Continuous Improvement

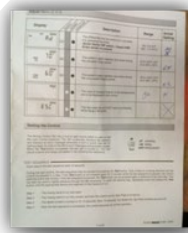


## Electrification:

Electric equipment, Heat Pumps,  
Solar repairs, EV Chargers, etc.

## Building controls:

Aligning existing equipment, new programming,  
sensors, front end- increased control!



## Envelope improvements:

Insulation, Storm windows, Weather stripping



## Lighting and controls:

LEDs, daylighting, occupancy

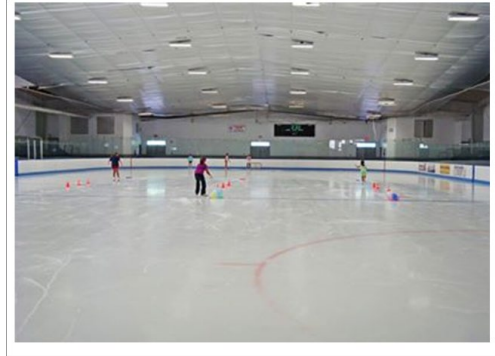
# Case Study: Technology driven efficiency

## Ice Rinks:

- Past Projects- ceiling
- Originally part of state-wide program
- Focus on quick efficiency measures
- Lights
- Preheat and reheat
- Zamboni fillers

## Existing Building Lesson:

- Dehumidification



# Case Study: Not always 1 for 1

## Trial Courts:

- Replace existing standard natural gas fired DHW tank with a hybrid heat pump electric hot water tank.
- Couldn't get up to temp
- New electric tanks did not have the same recovery ability as the Nat Gas fired tanks.
- Booster was installed keep the re-circ line at a stable temperature to meet code.

## Existing building lesson:

- Could have been some cross-flow with leaky check valves...



The new degree of comfort™

Water Commercial Electric Hybrid Water Heaters

**Hybrid Electric Commercial water heaters are available in 50, 65 and 80-gallon capacities and are the most efficient water heaters available**

**Efficiency**

- High 3.55 - 3.70 UEF reduces operating cost
- ENERGY STAR® rated

**Performance**

- Delivers more hot water than most standard electric water heaters – 67 gallons first-hour delivery for 50-gallon model, 75 gallons FHD for 65-gallon model and 89 gallons FHD for 80-gallon model
- Ambient operating range: 37-145° F is widest in class, offering more days of HP operation annually; designed to meet Northern Climate Spec (Tier 3)
- Maximum temperature setting is 150°F

**Easy Installation**

- Easy access side connections
- Quick access to electrical junction box
- Easily replaces a standard electric water heater

**Integration**

- LCD Screen with built-in water sensor alert with audible alarm

**EcoNet®**

- EcoNet® WiFi-connected™ technology and free mobile app gives users control over water systems, allowing for customizable temperature, vacation settings, energy savings and system monitoring at home or away. Visit [Rheem.com/hybridsolutions](http://Rheem.com/hybridsolutions)
- Water sensor detects water outside of the unit and sends an alert via the free EcoNet mobile app

**Operation Modes**

- Energy Saver
- Heat Pump
- High Demand
- Electric
- Vacation: 2-28 days (or placed on hold indefinitely)

**Plus...**

- Premium grade anode rod with resistor extends the life of the tank
- 3/4" NPT water inlet and outlet; 3/4" condensate drain connections
- Incoloy stainless steel resistor elements
- Dry-fire protection
- Easy access, top mounted washable air filter
- 2" Non-CFC foam insulation
- Enhanced flow brass drain valve
- Temperature and pressure relief valve installed
- Low lead compliant

**Warranty**

- 3-Year limited tank and parts warranty

See Commercial Warranty Certificate for complete information.  
\*WiFi broadband internet connection required.

**Efficiency** | These models have been tested according to DOE test procedures, and exceed the minimum energy factor requirements of current ASHRAE Standards (part of the federally mandated Energy Policy Act (EPA)). Also exceeds energy efficiency codes of all states including California Energy Commission (CEC).



**Rheem Hybrid**  
50, 65 and 80-Gallon Capacities  
208-240 Volt / 1 PH / 30 Amps  
Electric

ABR ENERGY PARTNER  
ENERGY STAR



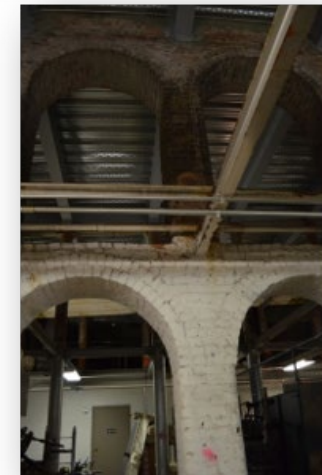
# Case Study: The Importance of Incremental Efficiency Upgrades

## State House:

- DCAMM performed an initial feasibility, to achieve energy savings and improve occupant comfort
- Original project covered lighting
- Energy and water savings project

### Next Steps:

- Weatherstripping
- Always continuing to improve!



# Case Study: The Importance of Incremental Efficiency Upgrades

## DDS:

- Started with small projects audits identified needs
- Lights, insulation, noted need for thermal control

## Next Steps:

- New Comprehensive Project
  - Improve occupant comfort
  - Meet Commonwealth decarbonization goals
  - Update building systems
- Up to 12 homes



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# Questions?

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