



# **Decision-making for the next decade: What the new incentive and regulatory environments mean for school facility investments**

**October 19, 2023**

# Agenda for today

Part 1 - Inflation Reduction Act and utility incentives: What does every school construction team need to know

Part 2 - Future-proofing your HVAC: Smith College's Geo-exchange System

Part 3 - Case study: Hopkinton's Elmwood Elementary



# Part 1 - Inflation Reduction Act and utility incentives: What every school construction team needs to know



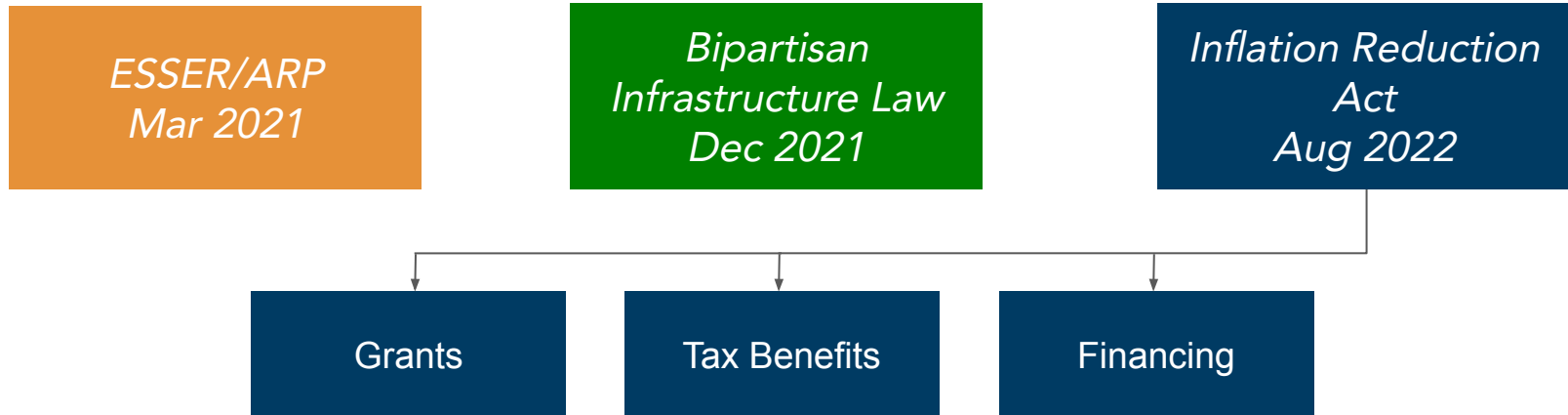
Sara Ross



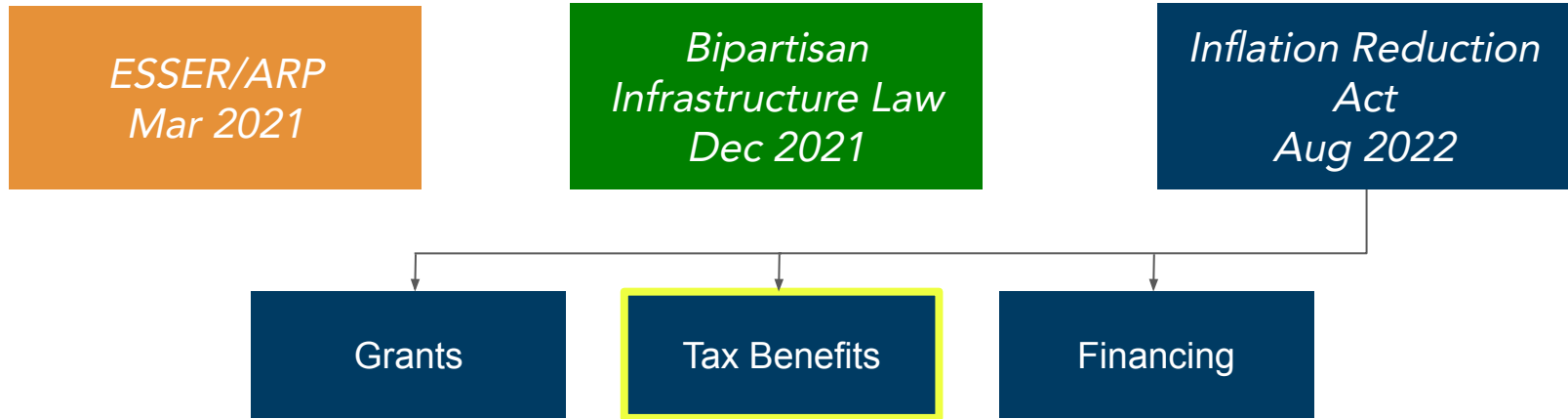
Kim Cullinane



# The context for IRA funding



# Largest opportunity (available today) is the tax benefits



# Tax credits available for this clean energy equipment

## 1. Solar energy



## 2. Energy storage



## 3. Electric vehicles



## 4. EV charging equipment



## 5. Ground-source heat pumps



# What's so special about the IRA's tax credits?

Non-competitive

Cash  
reimbursement

Available until  
2033+

Unlimited funding

What is the amount of my credit?

**Cost Basis \$ x**

**Rate % x**

**Reduce for Tax-Exempt Financing % =**

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**Value of IRA Tax Credit**





# Determining the cost basis. We have experience.

## IRS Guidance

Notice 2018-59

“Geothermal Heat Pump Property - On-site physical work of a significant nature may include the installation of ground heat exchangers, heat pump units, or air delivery systems (ductwork).”

## From Industry Association based on past experience of members:

Federal financial incentives include every part of the mechanical systems required to make a complete package including wells, distribution piping, electrical, controls, heat pump equipment, all required peripherals (pumps and VFD's, etc.) and labor.

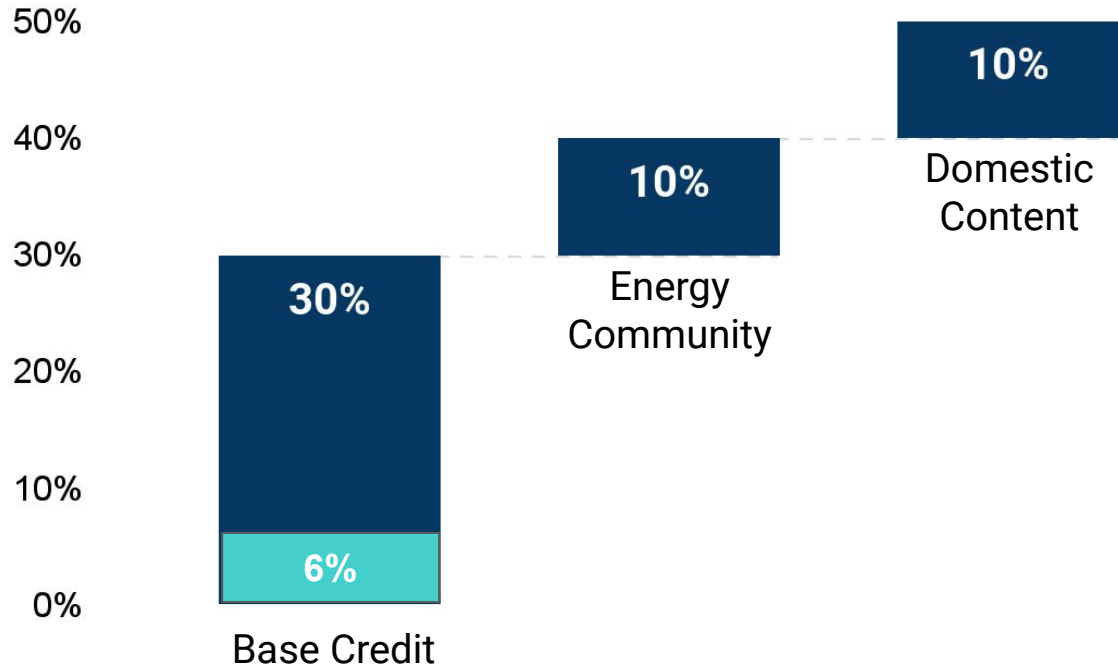


D20 - PLUMBING	\$2,454,125
D30 - HVAC	\$11,264,869
D50 - ELECTRICAL	\$7,910,861

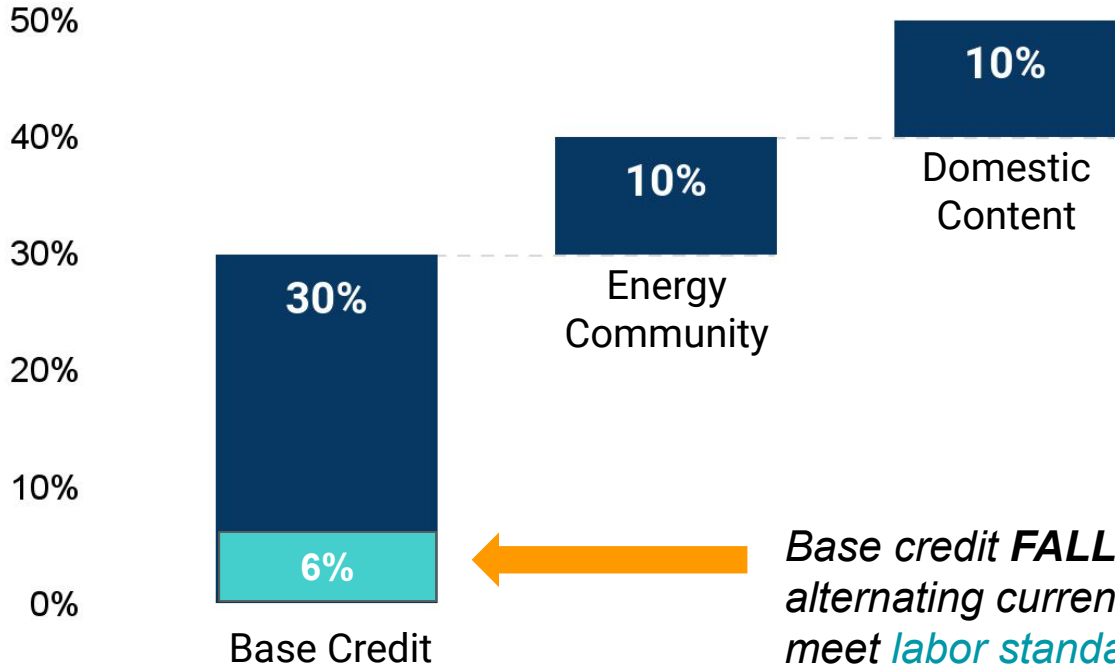


*Determine relevant costs from HVAC, plumbing and electrical scopes based on past guidance and experience.*

# Understanding the project's rate. Bonus credits may apply.



# Know the 1 MW test & implications for labor standards



**INFLATION REDUCTION ACT**

**Prevailing Wage & Registered Apprenticeship Overview**

The information in this document may be subject to change as guidance is issued by the IRS, DOL, and other relevant tax, health, state, and IRS departments for further details and eligibility requirements.

**Overview:**  
To qualify for increased credit or deduction amounts of certain energy tax incentives, taxpayers generally need to ensure that laborers and mechanics employed in the construction, alteration, or repair are paid to meet their applicable prevailing wage rates and to employ apprentices from registered apprenticeship programs for a certain number of hours. By meeting the necessary Inflation Reduction Act (IRA) prevailing wage and apprenticeship requirements, taxpayers can increase the total amount of their clean energy tax incentives by 6 times. There are strict exceptions, for example under Section 48C(b)(2)(C), that apply if the project is not for a qualified construction project beginning construction before January 28, 2023, where taxpayers may be eligible to claim the 6 times increase without meeting the prevailing wage and apprenticeship requirements.

**Prevailing Wage:**  
The Department of Labor (DOL) determines the prevailing wage rates for each specification of laborers and mechanics ("labor classification") in a predetermined geographic area for a particular type of construction. In general, taxpayers claiming an increased credit or deduction amount must ensure that laborers and mechanics employed by the taxpayer in its construction or alterations are paid the prevailing wage, which includes the basic hourly wage rate and any fringe benefits (as established by the applicable local, state, or federal government, contract, or repair of a qualified facility, project, property, or equipment (collectively, "local wage rates are based on general wage determinations on non-government wage determinations. A general wage determination reflects wage rates determined by DOL for a particular type of construction. In the absence of an applicable general wage determination, taxpayers may request a supplemental general wage determination from DOL).

**More Information**  
For more details please also see the guidance and Inflation Reduction Act Department of Labor. See page 2 for a list of which tax incentives can be increased by meeting the prevailing wage and apprenticeship requirements.

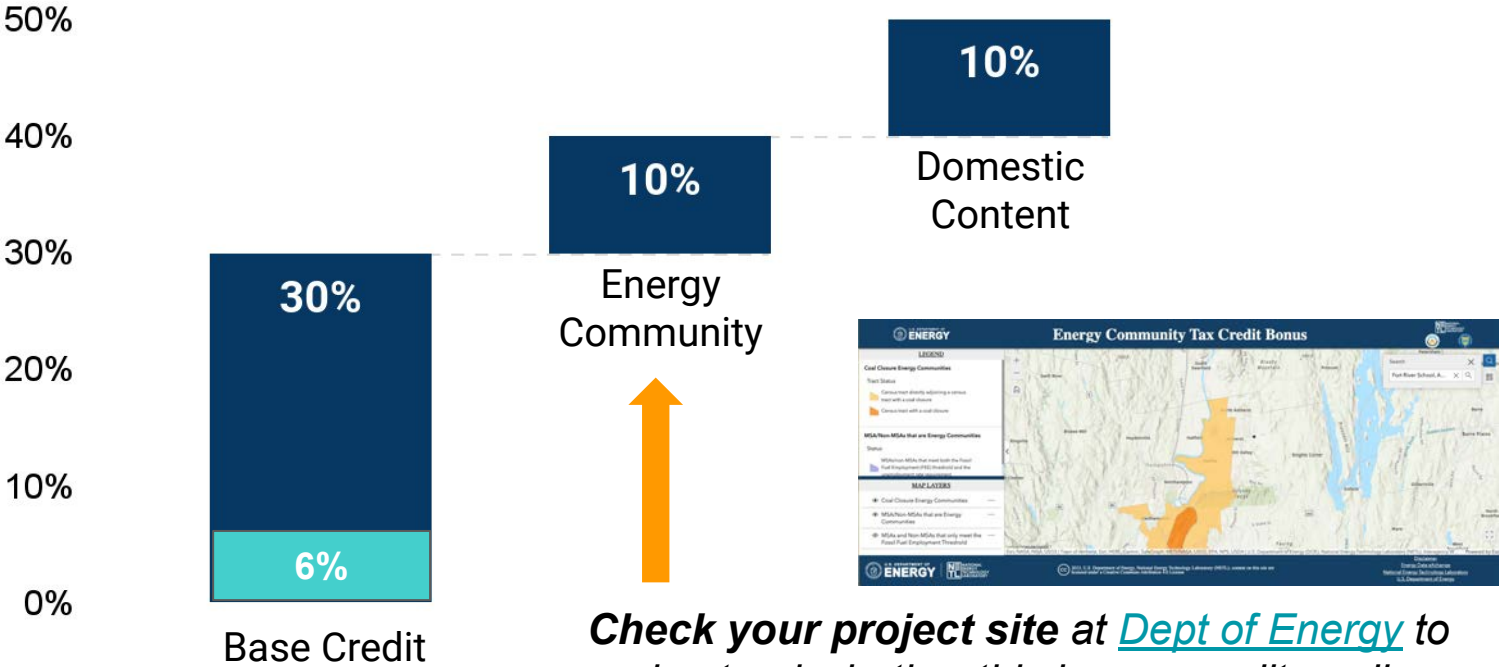
**IRA Registered Apprenticeships:**  
Each taxpayer (or contractor or subcontractor) who employs four or more workers to perform construction, alteration, or repair work on a facility must employ one or more qualified apprentices when the apprenticeship requirements apply. In addition, a minimum percentage of the total labor hours of the construction, alteration, or repair project must be performed by qualified apprentices from a registered apprenticeship program. This percentage is 12.5 percent for facilities beginning construction in 2023 and it rises to 15 percent for facilities beginning construction in 2024 or after. Taxpayers (or contractors or subcontractors) must ensure that any applicable credit or deduction to justify workers established by the registered apprenticeship program are met. An exemption may apply under a taxpayer (or contractor or subcontractor) has requested qualified apprentices from a registered apprenticeship program and its apprentices are available. For more information or to learn about finding apprentices, see Inflation Reduction Act Department of Labor.

**Recordkeeping Requirements:**  
Taxpayers claiming an increased amount for a particular tax incentive by meeting the prevailing wage and apprenticeship requirements are subject to specific recordkeeping requirements. Taxpayers must obtain and preserve records related to the employment of laborers, mechanics, and apprentices, including the records of any contractor or subcontractor. Examples include each worker's or mechanic's hourly rates, hours worked, deductions from wages, and actual wages paid, among other records.

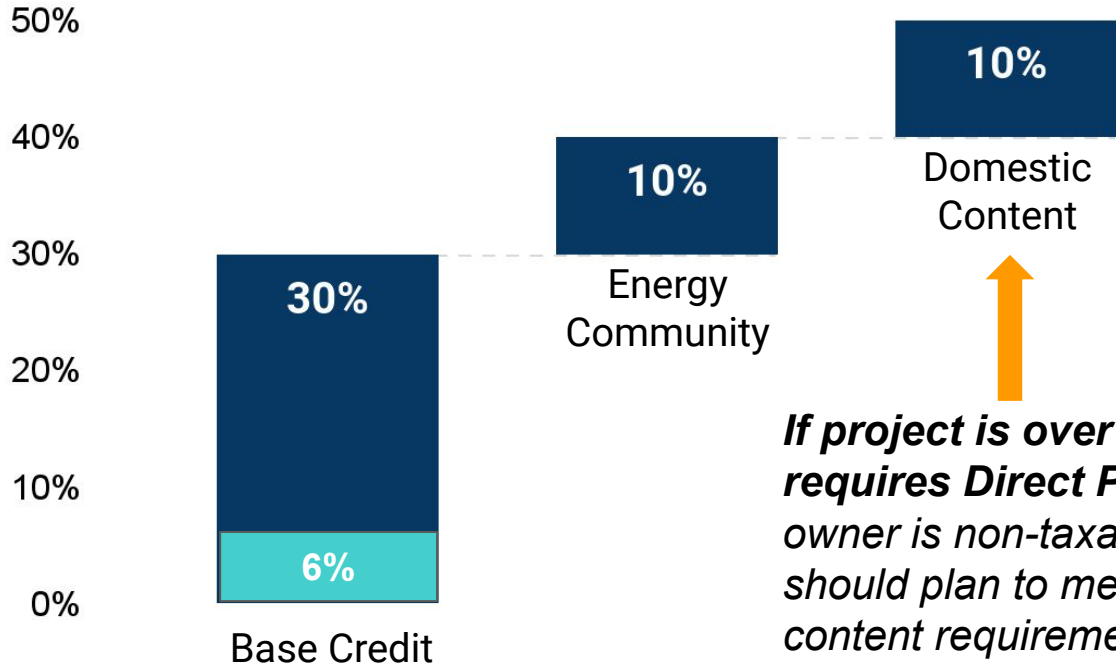
**Corrections and Penalties:**  
Taxpayers who fail to meet the prevailing wage and apprenticeship requirements may still be able to claim the increased tax incentive amounts by making certain correction and penalty payments. For failure of the prevailing wage requirements, taxpayers must make corrective payments for any unpaid or missing wages, plus interest, to the affected laborers and mechanics, and taxpayers may also make a penalty payment to the IRS. For the apprenticeship requirements, taxpayers must make a penalty payment to the IRS. Different correction and penalty amounts apply when the taxpayer's failure is due to inadvertent disregard.

**Project Labor Agreements:**  
Provisions for failure to meet prevailing wage and apprenticeship requirements may not apply to taxpayers employing laborers, mechanics, and apprentices under a qualifying project labor agreement that meets certain requirements.

# Check your site location for the “energy community” bonus



# Domestic content will be critical if over 1 MW



***If project is over 1MW and requires Direct Pay (e.g. owner is non-taxable entity) should plan to meet domestic content requirements.***



Available here:  
<https://www.bluegreenalliance.org/resources/bluegreen-alliance-domestic-content-user-guide/>

# Adjust the rate if using tax-exempt bonds

Example:

$$\begin{array}{ccccccc} (30\% + 10\%) = 40\% & \text{less} & 15\% & = & 34\% \\ \text{Base credit} & & \text{Domestic} & & \text{Tax-exempt} \\ & & \text{content adder} & & \text{bonds} \end{array}$$

“To the extent that a project is financed with tax-exempt debt and eligible for the PTC or ITC, the amount of the tax credit is reduced by the lesser of (i) 15% or (ii) the portion of the qualifying project that has been financed with tax-exempt debt. Because this is a “lesser of” test, this allows such projects to be financed 100% with tax-exempt debt, while only reducing the direct pay tax credit by 15%.”

Source: JDSupra, [“Inflation Reduction Act Levels Renewable Energy Playing Field for Tax-Exempt Entities”](#) August 26, 2022

# Estimated value of IRA tax benefits for a hypothetical K-12 school project

	<b>Basis</b>	<b>x</b>	<b>Rate</b>	<b>=</b>	<b>Estimated value</b>
<b>Tax credit for ground-source heat pumps*</b>	\$11,264,869		34%		<b>\$3,830,055</b>
<b>Tax credit for solar</b>	\$2,310,000		25.5%		<b>\$589,050</b>
<b>Tax credit for energy storage</b>	\$500,000		25.5%		<b>\$127,742</b>
<b>Total estimated tax benefits</b>					<b>\$4,546,847</b>

\* This project assumes a 280-ton GSHP systems which converts to less than 1MW-ac so project is *exempt* from labor standards and needing to meet domestic content requirements for purposes of using Direct Pay. Regardless, project plans to meet domestic content for the GSHP system and to therefore collect the 10% adder.

# MSBA policy change makes federal \$ more valuable

	<i>Before Policy Change</i>	<i>After Policy change</i>
<b>Initial cost basis</b>	\$100,000,000	\$100,000,000
<b>Third-party funding</b>	\$5,000,000	\$5,000,000
<b>Adjusted cost basis</b>	\$95,000,000	--
<b>State share (%)</b>	60%	60%
<b>Local share (%)</b>	40%	40%
<b>State share (\$)</b>	\$57,000,000	\$60,000,000
<b>Local share (\$)</b>	\$38,000,000	\$35,000,000
<b>Net change to local share due to new policy</b>		<b>-\$3,000,000</b>

For more information, read the MSBA's memo about the new Third-Party Funding Policy here:

[https://www.massschoolbuildings.org/sites/default/files/edit-contentfiles/About\\_Us/Board\\_Meetings/2023\\_Board/6.21.2023/UpdatedThirdPartyFundingPolicy6\\_21\\_2023.pdf](https://www.massschoolbuildings.org/sites/default/files/edit-contentfiles/About_Us/Board_Meetings/2023_Board/6.21.2023/UpdatedThirdPartyFundingPolicy6_21_2023.pdf)



# Check out our new web resources for more information!



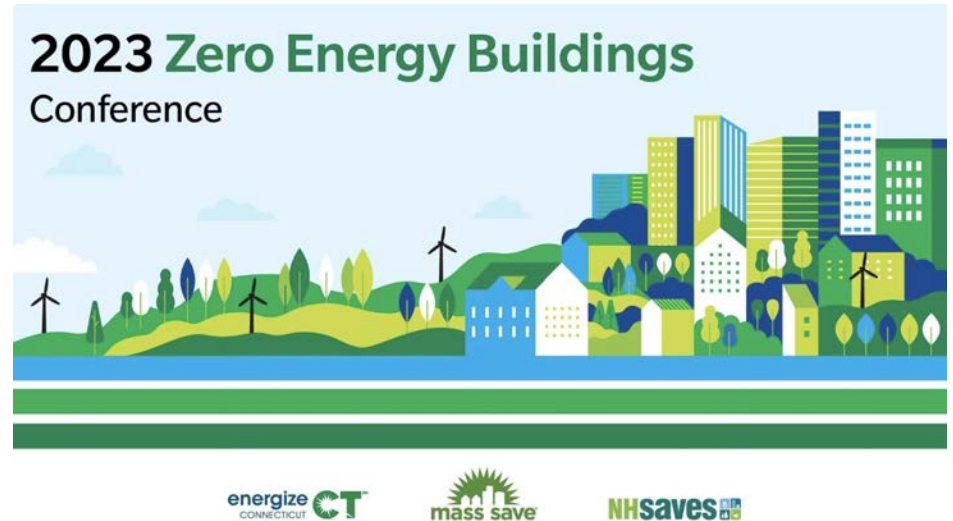
The Inflation Reduction Act (IRA) is the largest investment in climate and clean energy in United States history. Billions of dollars are now available to schools for going green.

<b>THE INFLATION REDUCTION ACT</b> brings new federal funding to schools that embrace clean energy!	<b>WHAT</b> clean energy technologies does the Inflation Reduction Act support?	<b>WHY</b> should schools invest in clean energy technologies?	<b>WHO</b> benefits from the Inflation Reduction Act?	<b>HOW</b> do schools get reimbursed by the Federal government?
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<https://www.undauntedk12.org/schools-and-the-ira>

# Want more on IRA and zero energy buildings? Watch these recorded sessions.

- Inflation Reduction Act  
<https://youtu.be/BQJqiq6Nyll>
- Ground Source Heat Pumps  
<https://youtu.be/QdN10otVBus>
- Importance of Building Envelope in Net Zero  
<https://youtu.be/pjl7WAL7F-s>
- Eversource Outlook and Program Updates  
<https://youtu.be/PssbifHIKTc>





# Commercial New Construction & Major Renovation Participation Pathways for K-12 Schools

WE ARE MASS SAVE:





**Together, we make good happen for Massachusetts.**

Your local electric and natural gas utilities and energy efficiency service providers taking strides in energy efficiency: Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid and Unitil.

As one, we form Mass Save<sup>®</sup>, with the common goal of helping residents and businesses across Massachusetts save money and energy, leading our state to a clean and energy efficient future.






WE ARE MASS SAVE:





# New Building/Major Renovation Participation Pathways

Path 1	Path 2	Path 3
Net Zero & Low EUI Buildings	Whole Building EUI Reduction	High Performance Buildings
		

Low EUI Pathways

# Path 1: Net Zero & Low EUI Buildings

## ACTON-BOXBOROUGH DOUGLAS-GATES ELEMENTARY SCHOOL

Opened Fall 2022 | All-electric



### Intent: Focus On Performance

- Buildings must perform at EUI target after first year of occupancy to obtain full incentive

### Key Program Drivers: EUI And Low Carbon

- Set an absolute energy use target – 25 EUI
- Work toward EUI target throughout design, construction and into first year of occupancy
- Decarbonize the building

### Technical Assistance

- Net zero design support - up to \$10,000
- Post occupancy verification Incentive - up to \$10,000

### Customer Incentives

Construction	Post Occupancy	Heat Pump Adder
Up to \$2.00/sf	\$1.50/sf	Air Source Heat Pumps: \$800/ton Variable Refrigerant Flow (VRF): \$1,200/ton Ground Source Heat Pumps: \$4,500/ton

# Example – New Elementary School

**172,000 SF new building**

**Solar PV:** \$2 million

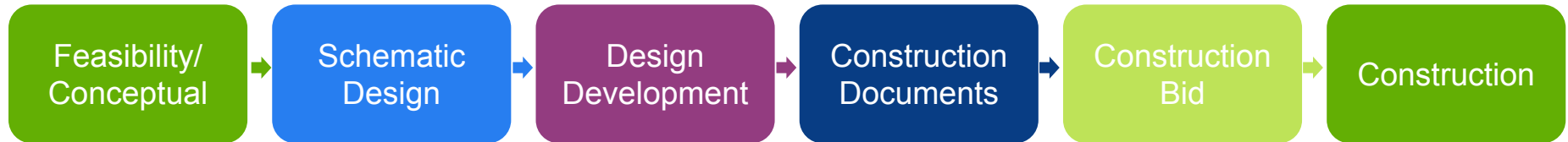
**Geothermal:** 340 tons, 110 wells  
at 600' depth: \$20 million

**Target site EUI:** 25

<b>Path 1 Mass Save Incentives with 25 EUI Target</b>	
\$2.00 /SF Construction Incentive	\$344,000
Electrification incentive for ground source heat pumps at \$4,500/ton	\$1,530,000
\$1.50/SF Post Occupancy Incentive	\$258,000
<b>Total</b>	<b>\$2,132,000</b>

# What Can You Do?

1. Add your low carbon, net zero, 25 EUI goals into your Request for Design Services
2. Engage Mass Save Sponsors on projects early in design
3. Start thinking about electrification of all end uses (e.g., heating, hot water, kitchen)
4. Look into IRA tax credits – consider hiring a tax attorney to assist



*Contact your Mass Save Electric Sponsor in this timeframe*



# Mass Save New Construction/Major Renovation Contacts

**More at MassSave.com**

[masssave.com/cincmr](https://masssave.com/cincmr)

Commercial Project Teams: Contact Your Electric Company Program Administrator to Start the Process

**Kim Cullinane**  
**Eversource**

[kim.cullinane@eversource.com](mailto:kim.cullinane@eversource.com)

**Tatsiana Nickinello**  
**Cape Light Compact**

[tnickinello@capelightcompact.org](mailto:tnickinello@capelightcompact.org)

**Eileen Barrett**  
**National Grid**

[Eileen.Barrett@nationalgrid.com](mailto:Eileen.Barrett@nationalgrid.com)

**Brad Hunter**  
**Unitil**

[hunterb@unitil.com](mailto:hunterb@unitil.com)

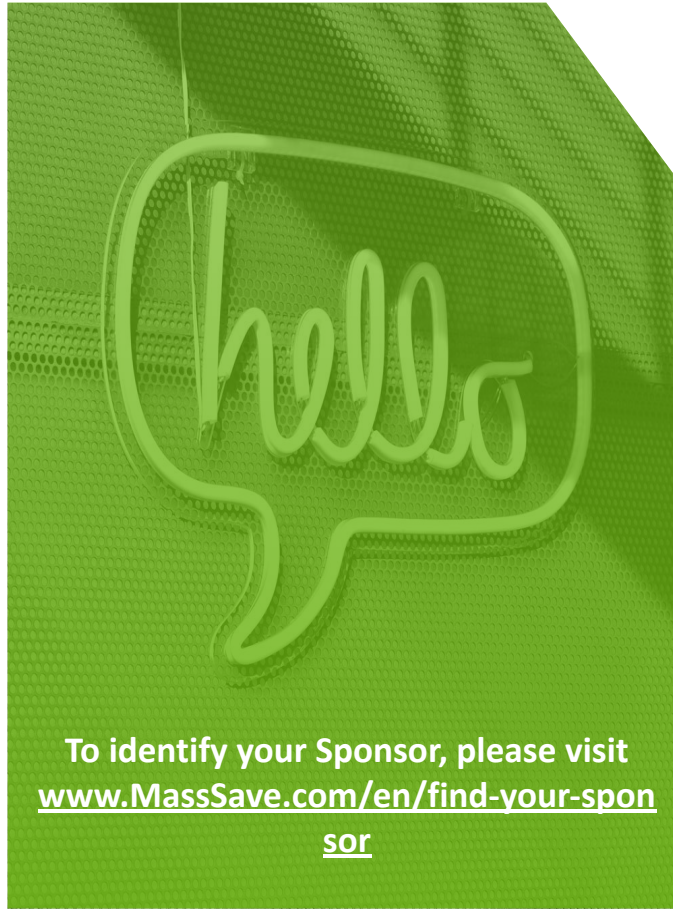
**Matt Caffrey**  
**Liberty Utilities**

[matthew.caffrey@libertyutilities.com](mailto:matthew.caffrey@libertyutilities.com)

**Andrew Christofor**  
**Berkshire Gas**

[achristofor@uinet.com](mailto:achristofor@uinet.com)

To identify your Sponsor, please visit  
[www.MassSave.com/en/find-your-sponsor](https://www.MassSave.com/en/find-your-sponsor)





# Existing Building Retrofit Decarbonization Offerings

WE ARE MASS SAVE:



# Electrification: Heat Pumps

## Prescriptive Rebates



Eligible equipment (**must be on QPL**)

Air source (air-to-air) heat pumps (\$2,500/ton)

Variable refrigerant flow air source heat pumps (\$3,500/ton)

Ground source heat pumps (\$4,500/ton)

Eligible Projects

< 150 tons, partial or full displacement

Used for space heating and cooling

Existing buildings only

## Custom Path



Use custom for...

Projects >150 tons

Equipment not covered by prescriptive offer

Eligibility criteria

Must produce net MMBTU reduction

Must NOT increase GHG emissions

Must meet cost-effectiveness criteria

Scoping study/focused study support offered

Incentives

Match prescriptive rates & need pre approval

Are subject to Sponsor budgets and total cost

For more information about heat pumps, please visit  
[www.MassSave.com/ciheatpump](http://www.MassSave.com/ciheatpump)

# Deep Energy Retrofit

## **Ambitious target: 40% reduction in GHG emissions**

Must include electrification and weatherization

Relative to existing energy usage

Sponsors pay 100% of energy assessment and scoping study costs

Sponsors pay at least 50% of detailed technical assessment study costs

## **Bonus incentive: \$1/ft<sup>2</sup>**

Sponsors pay incentives as measures are implemented

Bonus incentive paid after target is reached

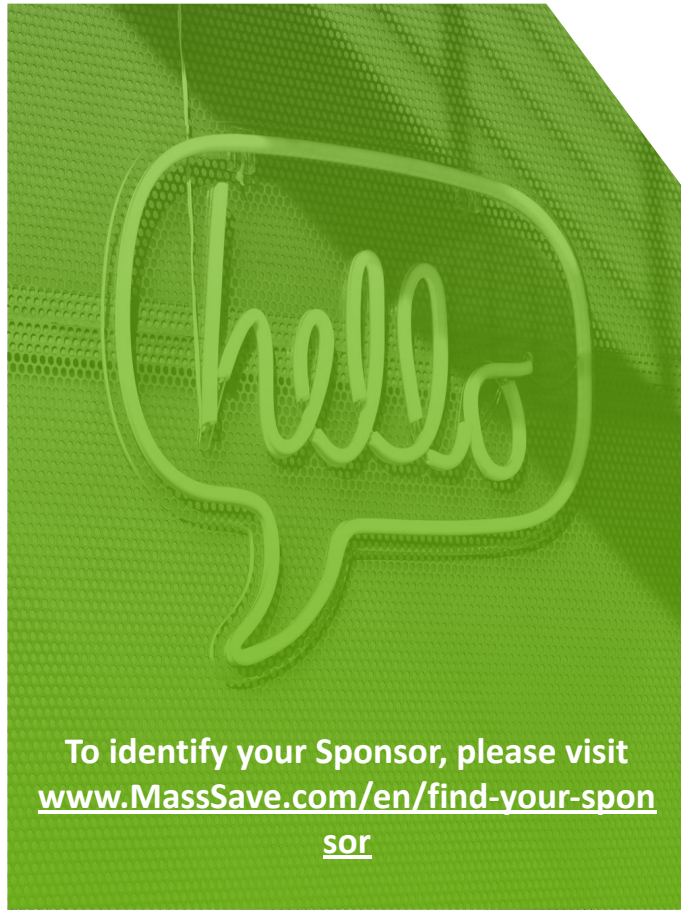
## **3 years to implement**

Sponsors provide implementation plan with milestones and verification requirements

For more information, please visit:  
[MassSave.com/en/business/programs-and-services/deep-energy-retrofit](https://masssave.com/en/business/programs-and-services/deep-energy-retrofit)



# Mass Save Existing Building Retrofit Contacts



To identify your Sponsor, please visit  
[www.MassSave.com/en/find-your-sponsor](http://www.MassSave.com/en/find-your-sponsor)

Fuel Displaced determines Mass Save Sponsor - If displacing natural gas, contact Gas Sponsor; if displacing oil, propane, or electric resistance, contact Electric Sponsor

**Ryan Willingham or  
Greg Sine  
Eversource**

[ryan.willingham@eversource.com](mailto:ryan.willingham@eversource.com)

[greg.sine@eversource.com](mailto:greg.sine@eversource.com)

**833-690-1284  
National Grid**

[heatpumpsma@nationalgrid.com](mailto:heatpumpsma@nationalgrid.com)

**508-324-7811  
Liberty Utilities**

[efficiency@libertyutilities.com](mailto:efficiency@libertyutilities.com)

**800-797-6699**

**Cape Light Compact**

[efficiency@capelightcompact.org](mailto:efficiency@capelightcompact.org)

**888-301-7700**

**Unitil**

[efficiency@unitil.com](mailto:efficiency@unitil.com)

**800-944-3212**

**Berkshire Gas**

[efficiency@berkshiregas.com](mailto:efficiency@berkshiregas.com)

# Part 2 - Future-proofing your HVAC: Smith College's Geo-exchange System

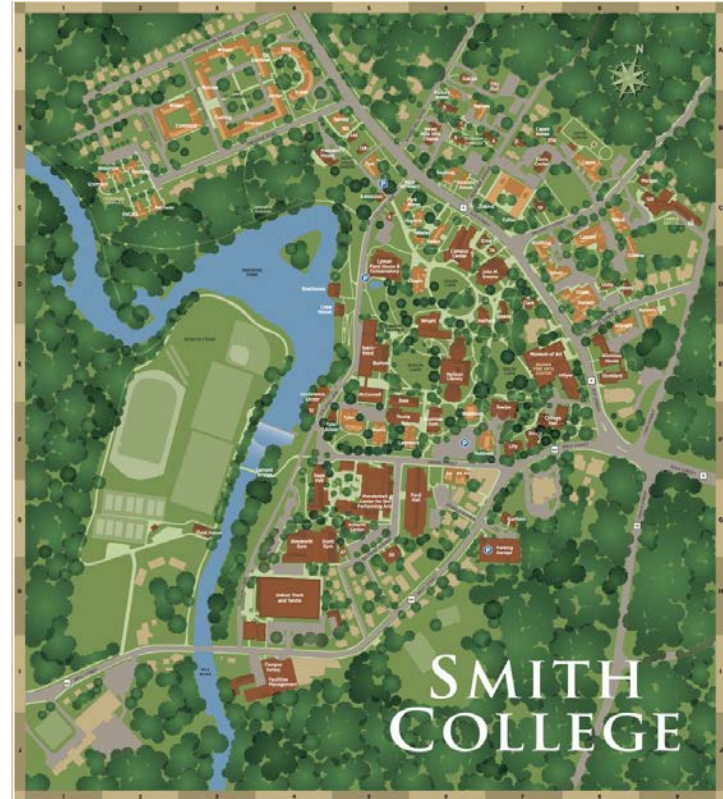


Dr. Alex Barron



# Smith College Facilities in a Nutshell

- Residential liberal arts college
- ~2500 undergraduate students
- 180 acre campus
- 3.2 million square feet
- ~130 buildings
- ~23,900 metric tons of carbon pollution (equivalent) per year



# Key Factors

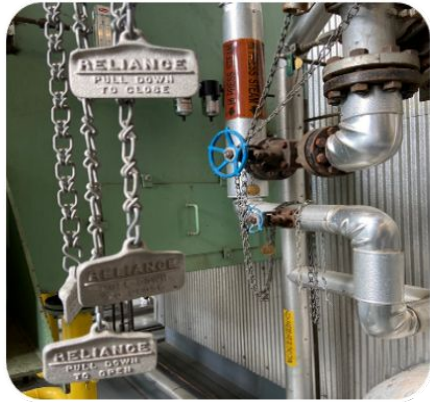
## Present:

- Aging steam infrastructure
- Occupant comfort
- Occupant health
- Fossil fuel price volatility

## Future:

- Climate policy (State/Federal)
- Hotter weather
- Cleaner electricity
- 2030 climate target





## Transition from Gas/Steam to Solar/Heat Pump



# The New System

Lower cost to operate

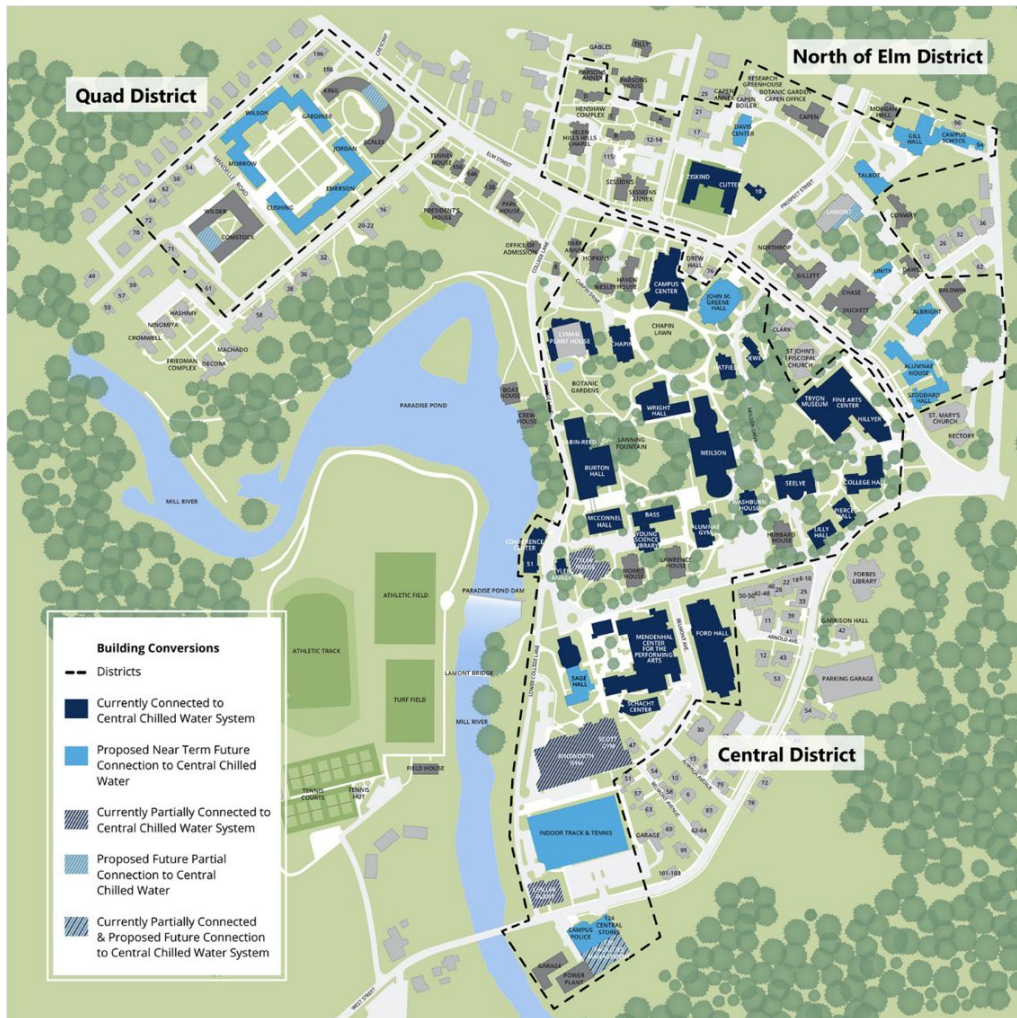
Improved reliability

Improved comfort

Expanded cooling

Greater cost stability

Lower carbon pollution, air pollution, water use



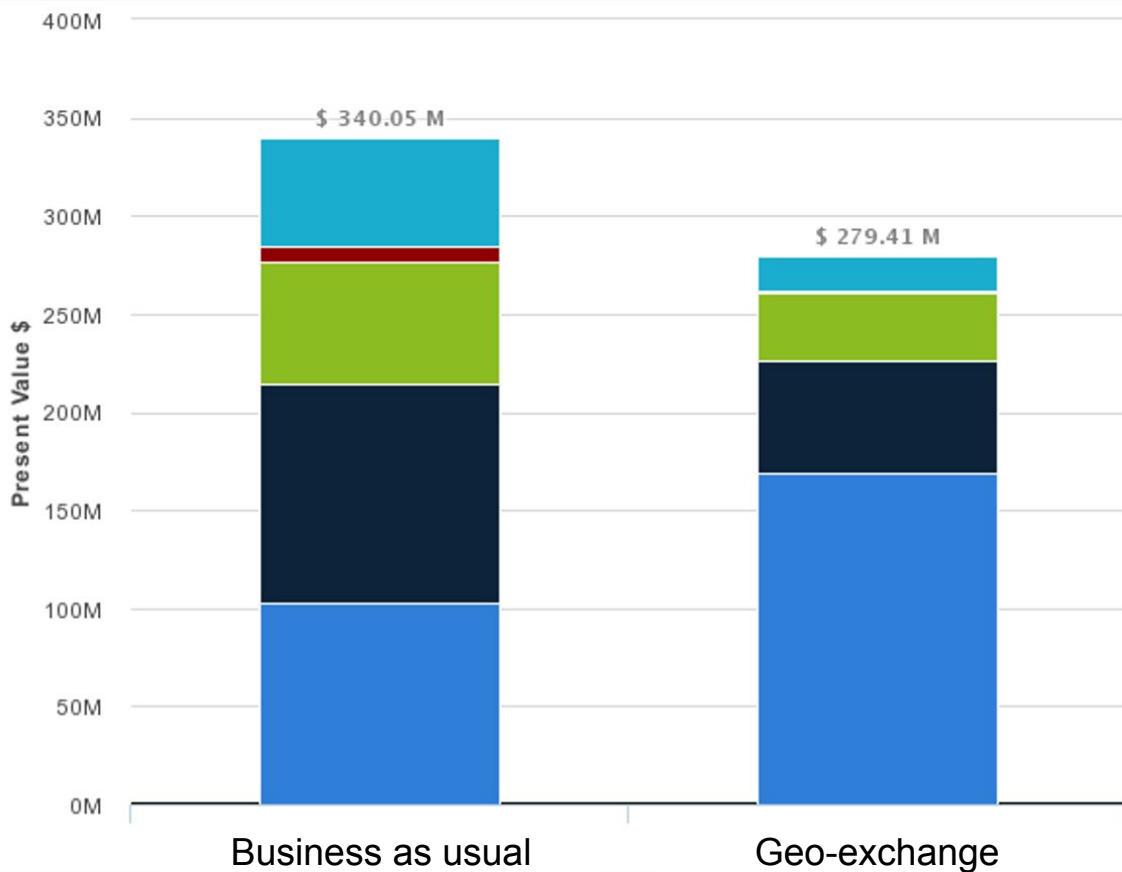
## Future-proofing your decisions

- Think about the full lifecycle costs
- Don't assume today's climate policy
- Consider all your benefits

# Smith's Approach

- Life cycle cost analysis (30+ years)
- Include a cost of carbon (~\$83/ton CO2 emissions)
  - Proxy for any future state/federal policies that alter economics
    - Boston BERDO Ordinance - Alternate compliance fee \$234/ton
    - New York State using \$126/ton (\$54 to \$414)
  - Common practice at Fortune 500 companies
- Track benefits
  - Student comfort/learning
  - Predictable energy costs

# Life-cycle Cost Comparison – 30 Year

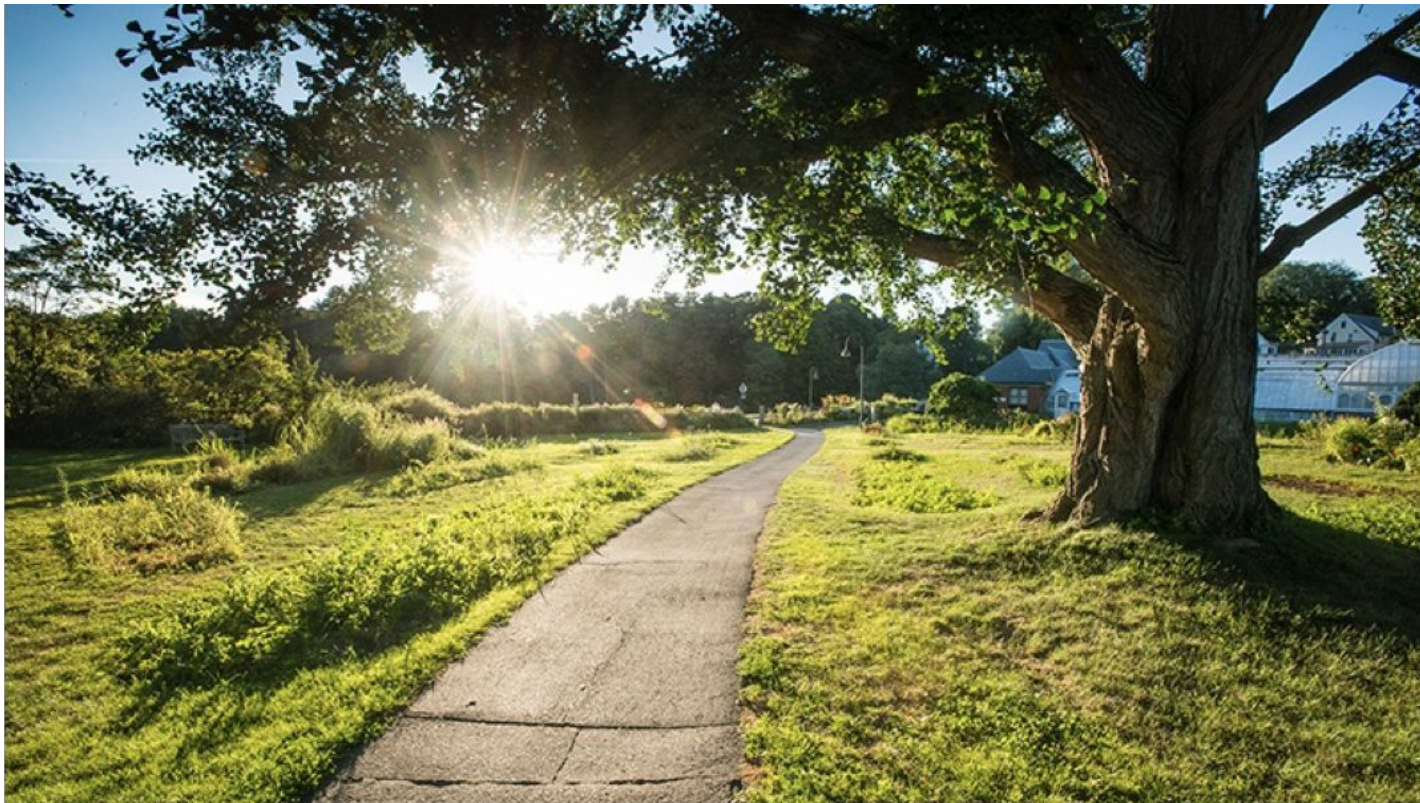


NOTE: This analysis was performed *before* the Inflation Reduction Act.





For more details: <https://smithgeoenergy.info/>



# Part 3 - Case study: Hopkinton's Elmwood Elementary



**Tim Persson**

Director of Facilities



**Robert Bell, AIA**

Principal



**Tony Hans, PE**

Vice President,  
Electrical Engineer



**Ben Hobbs, PE**

Mechanical Engineer



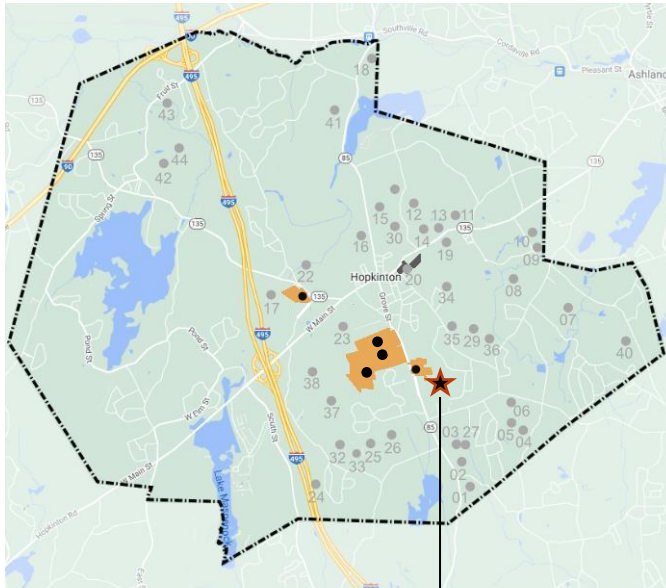
**HOPKINTON**  
PUBLIC SCHOOLS

**PERKINS —  
EASTMAN**

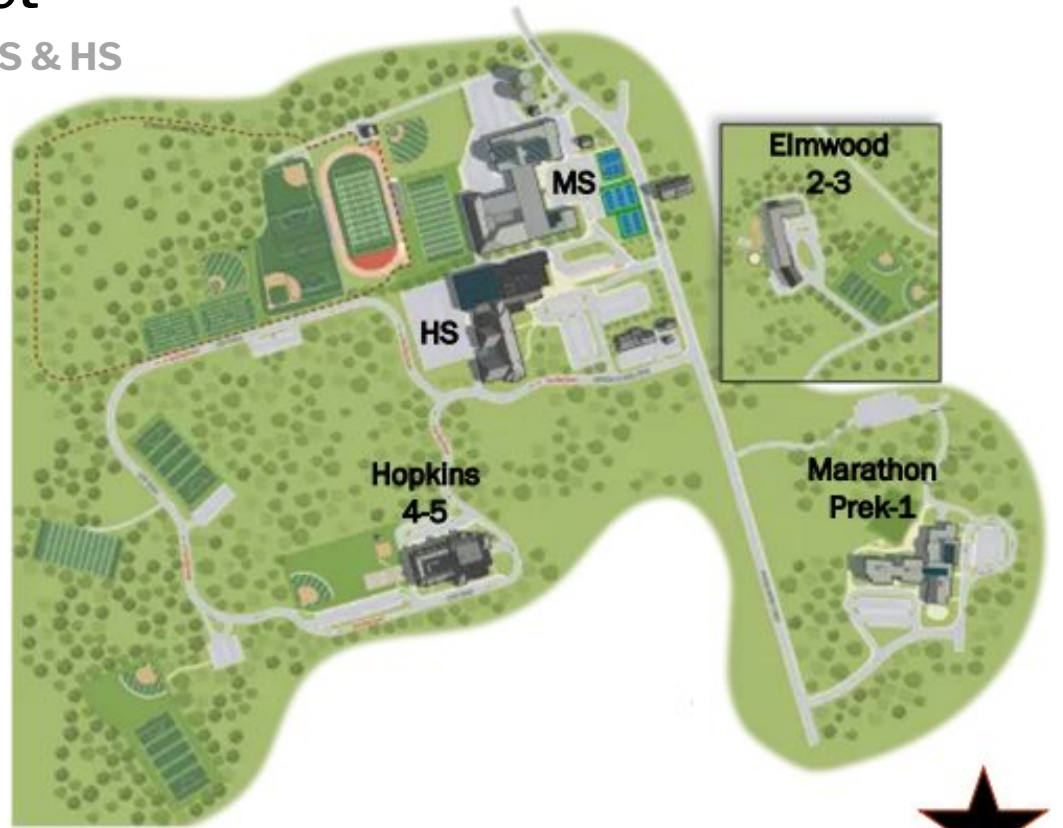


# Hopkinton School District

MARATHON, ELMWOOD, HOPKINS, MS & HS



Proposed  
New Grade 2-4  
Elmwood



ELMWOOD SCHOOL, HOPKINTON





# The Project At Hand



# Context for Conversations and Decision Making

Commonwealth of Massachusetts



Report commissioned by the Massachusetts Executive Office of Energy and Environmental Affairs to identify cost-effective and equitable strategies to ensure Massachusetts achieves net-zero greenhouse gas emissions by 2050.

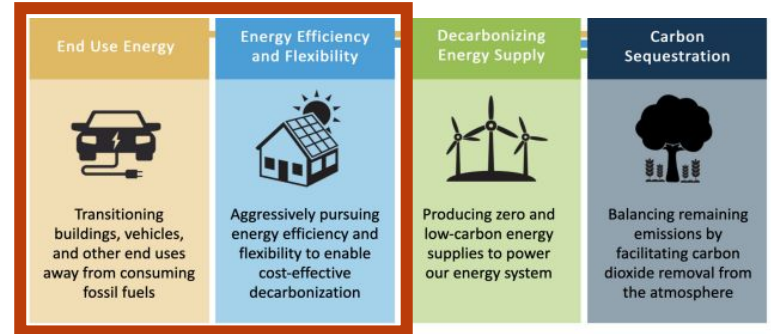
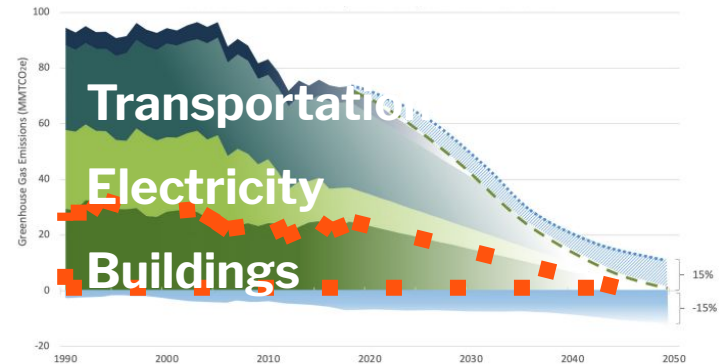


Figure 1. Four key “pillars of decarbonization” for the Commonwealth



# HVAC Systems - What is Important to You?

Results from ESBC Meeting 12/13/2022

## Higher Priority

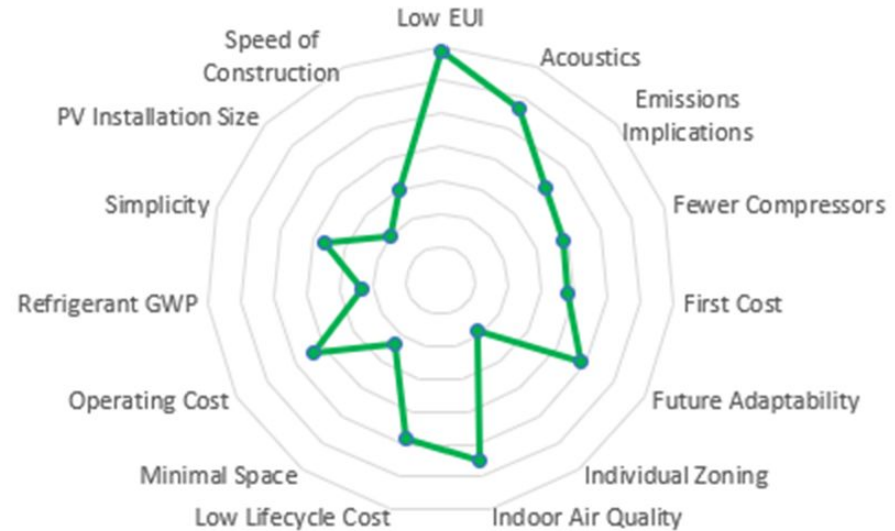
1. Low EUI
2. Acoustics
3. Indoor Air Quality
4. Lowest Life Cycle
5. Future Adaptability

## Medium Priority

1. Operating Cost
2. Emissions Implications
3. First Cost
4. Fewer Compressors
5. Simplicity

## Lower Priority

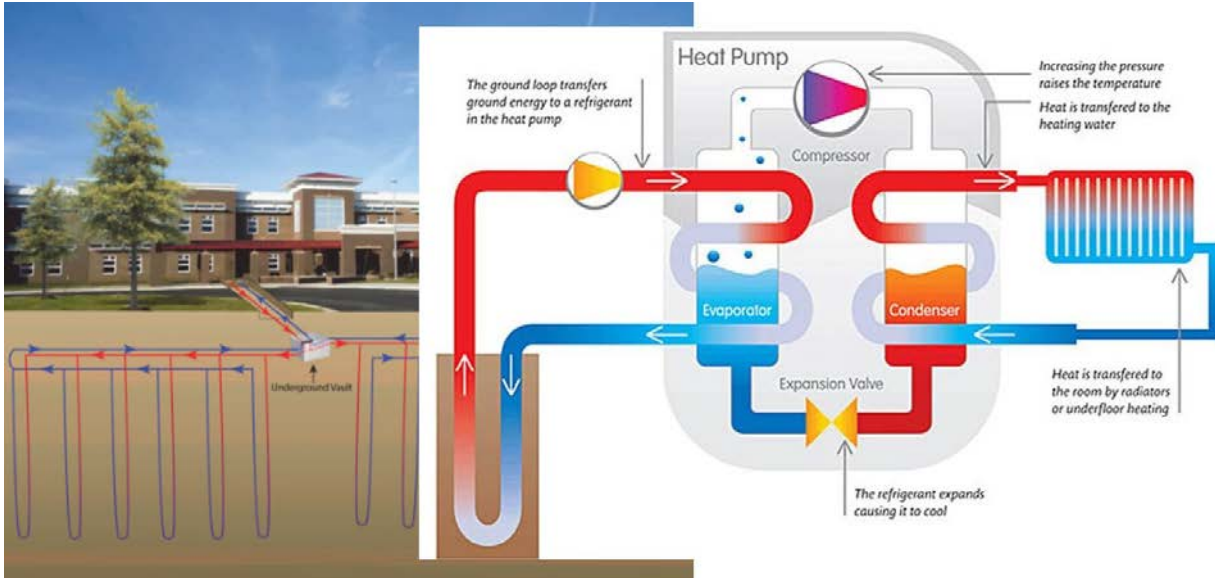
1. Speed of Construction
2. Refrigerant Global Warming Potential
3. Minimal Space
4. PV Installation Site
5. Individual Zoning



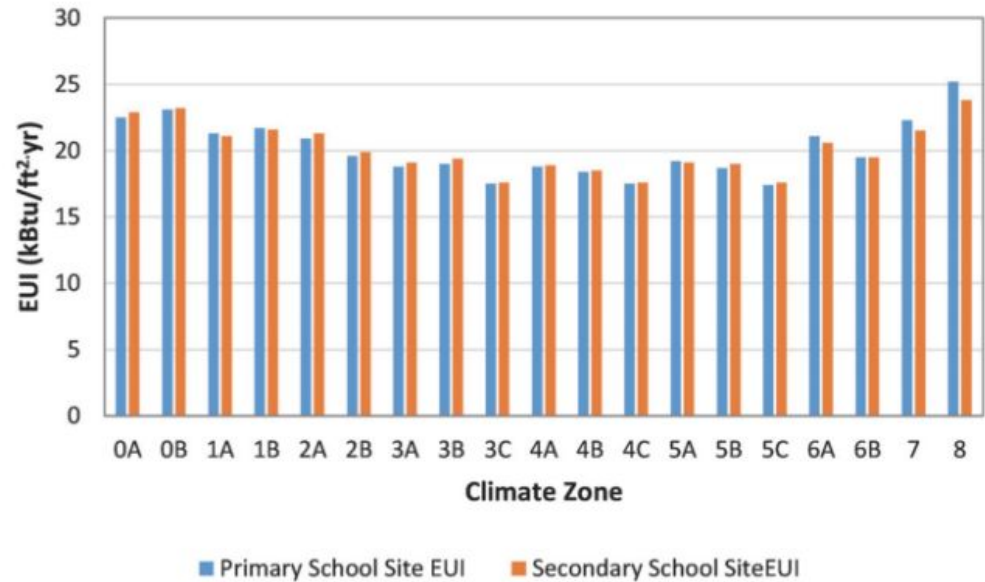
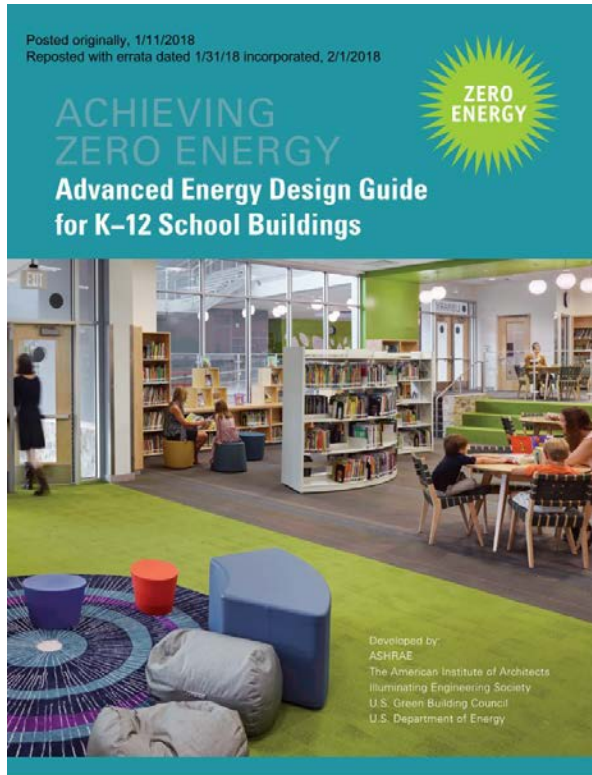
Each circle represents 0.5 point – the closer to the outer ring, the more important



# Distributed Ground Source Heat Pumps



# Proof is Out There – Advanced Energy Design Guide

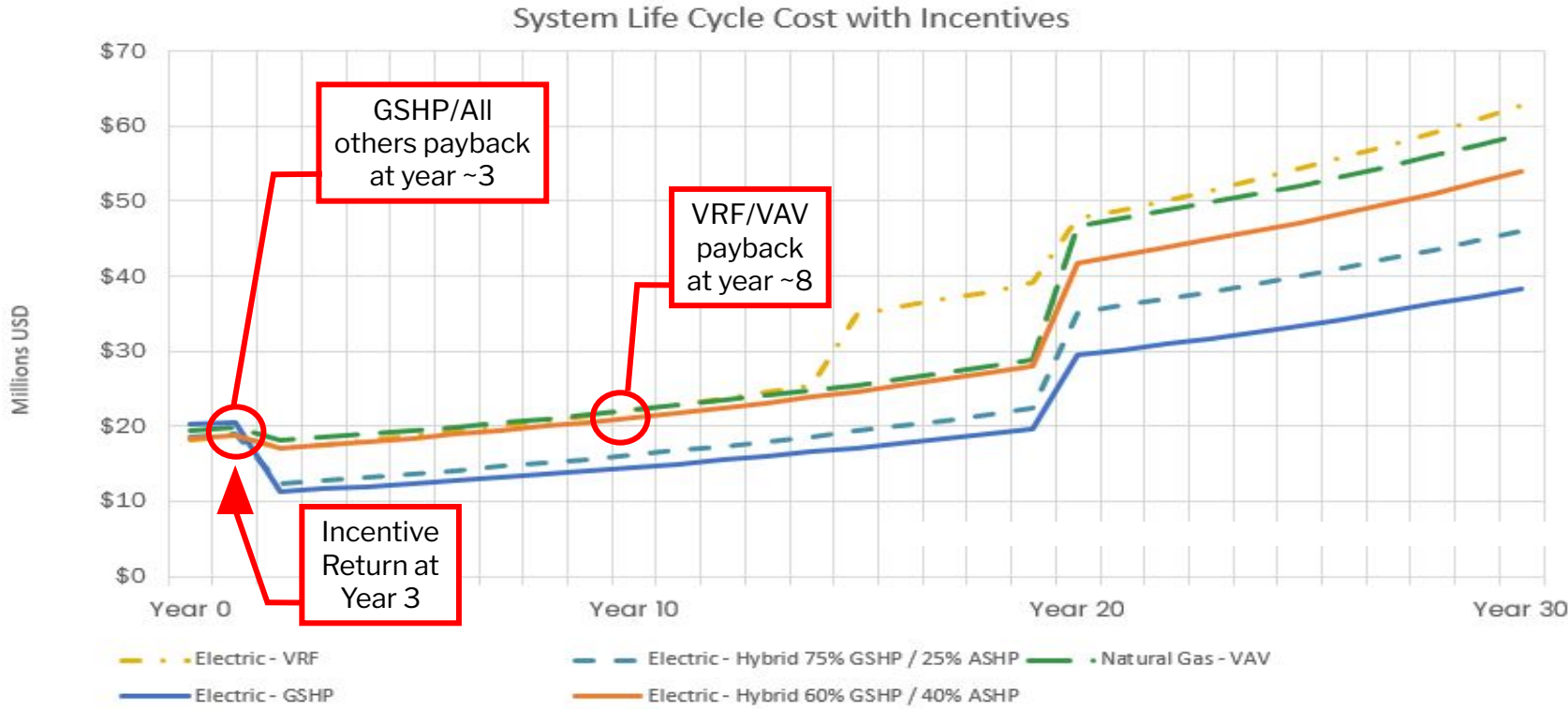


# IRA Financial Impact

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<b>Elmwood SF</b>	<b>~175,000 SF</b>
<b>Construction Budget/SF</b>	<b>\$714/SF</b>
<b>Construction Budget</b>	<b>\$125,000,000</b>
<b>HVAC Budget/SF</b>	<b>\$92/SF</b>
<b>HVAC Budget</b>	<b>\$16,100,000</b>
<b>IRA %</b>	<b>34%</b>
<b>IRA Impact</b>	<b>\$5,474,000</b>
<b>Mass Save</b>	<b>\$1,700,000</b>

# Life Cycle Cost – with Mass Save & IRA Incentives



# Common Questions on the IRA

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- Are the IRA incentives real? Is this a grant? Will we definitely receive them?
- When and how will the money come?
- What strategies can we use to cover the upfront costs since funds are only received as a reimbursement?
- What are the domestic content requirements and how do we comply?
- What are the labor provisions and how do we comply?
- How will IRA work within in the context of Mass. public procurement? (equals, labor, apprenticeships, caps, etc.)
- What are the skills / competencies needed to successfully navigate this process? Are tax advisors needed?



# Takeaways for today

## What's new:

- Incentives are redefining what makes financial sense and what is affordable
- Policy landscape is shifting (quickly!) toward all-electric, zero-emission technologies
- MSBA's new policy governing 3rd-party funding is a big deal (esp. for low-wealth communities)

## What to do:

- Continue your learning about the Inflation Reduction Act.
- (Re-)Evaluate every project through the lens of new incentives.
- Build your team. Leverage the leaders.



# TELL US

**about a school  
project in your  
community that will  
leverage the IRA**

Complete this quick form:

<https://forms.gle/UYfWVjKLigaL7V8d9>

Sara Ross

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# QUESTIONS & ANSWERS

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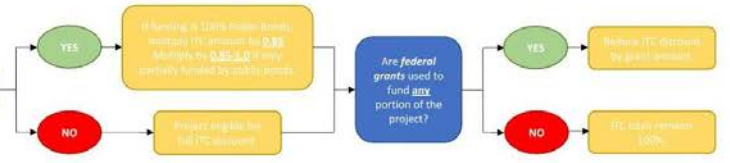
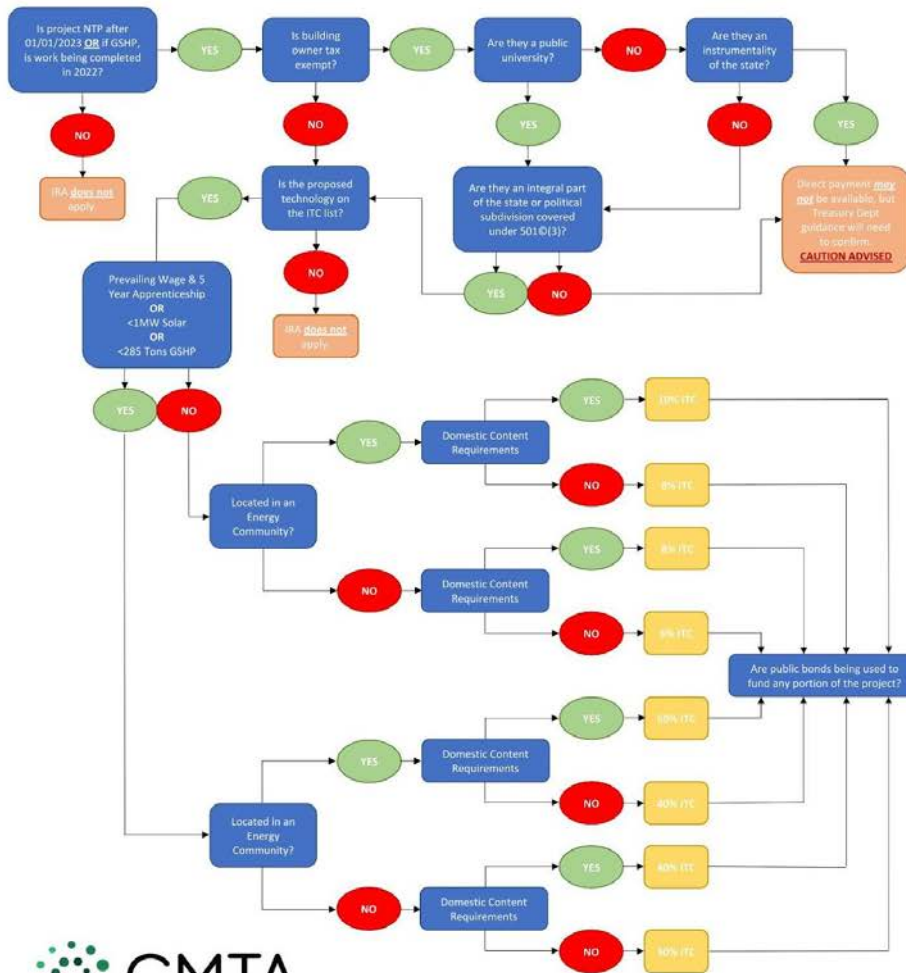
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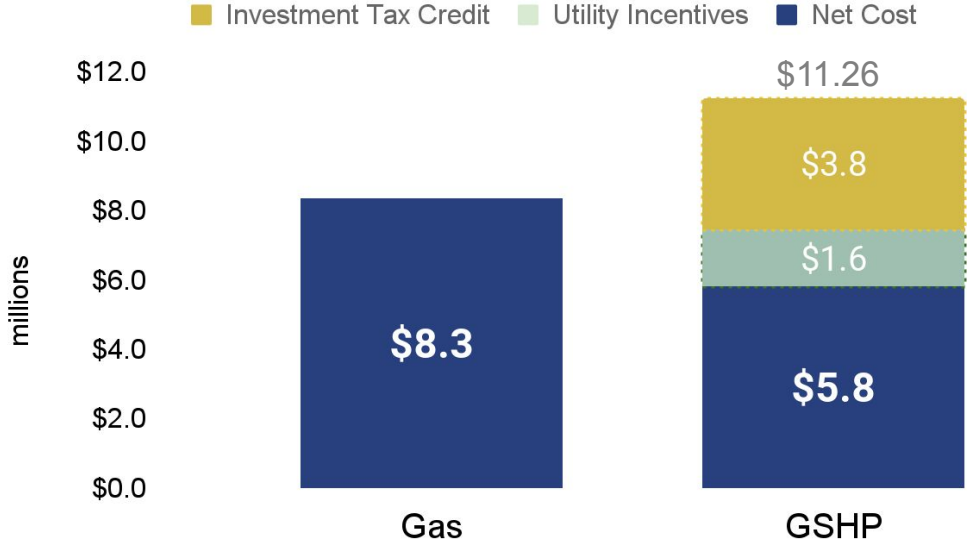
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# Fort River Elementary (Amherst, MA)

Cost estimates for HVAC system installation w incentives  
(Gas vs Ground-Source Heat Pump)



# DeValles Elementary (New Bedford, MA)

HVAC Systems	Initial Costs (\$) (w/Incent)	Maint. Costs/Yr (\$)	Energy Costs/Yr (\$)	Total Operating Costs/Yr (\$)	Incentives /Rebates (\$)	Inflation Reduction Act (IRA)	Total LCCA w/Rebates
Option 1 – Displacement Ventilation	8,549,120 (8,512,520)	25,647	111,656	137,303	36,600	N/A	10,094,934
Option 2 – Air Cooled Chillers & Boilers	8,549,120 (8,512,520)	28,212	308,372	336,584	36,600	N/A	12,391,661
Option 3 – VRF System	8,014,800 (7,274,208)	47,287	321,035	368,322	740,592	N/A	11,519,129
Option 4 – Air to Water HP Chiller	9,617,760 (9,017,168)	42,746	291,873	334,619	600,592	N/A	12,873,651
Option 5 - Geothermal	13,892,320 (6,092,492)	32,059	285,657	317,717	1,895,592	42.5% Cost of HVAC System (5,904,236)	9,754,185

Source: Presentation by C.A. Crowley to DeValles School Building Committee, August 8, 2023



# Central Middle (Greenwich, CT)

## FIRST YEAR COST

- PPA PV: assuming \$0.08/ kWh (PPA rate may vary depending on the PPA agreement with the vendor).
- PPV Geo: pay 10% of geothermal well costs every year for 25yrs, no escalation /inflation increase.
- In DD, the design team will work to get the system ALT1 baseline pEUI to 25, or below. Doing so will enable the pursuit of full Energize CT incentive rebates.

First Year	Base Case	Alt 1 Geo	Alt 2 VRF	Alt 1 w/PPA PV	Alt 2 w/PPA PV	Alt 1 w/PPA PV & Geo
HVAC Cost	\$9.6M	\$9.8M	\$8.6M	\$9.8M	\$8.6M	\$9.8M
PV Cost	\$3.0M	\$3.0M	\$3.0M	-	-	-
Geothermal Well Cost	-	\$3.1M	-	\$3.1M	-	-
Geothermal PPA Cost	-	-	-	-	-	\$0.3M
pEUI	38.3	27.4	33.7	27.4	33.7	27.4
Net pEUI	17.6	6.7	13.0	6.7 + 20.7 PPA	13.0 + 20.7 PPA	6.7 + 20.7 PPA
Energy Rates	Grid Electricity: \$0.16 / kWh Natural gas: \$1.04 / therm	Grid Electricity: \$0.16 / kWh	Grid Electricity: \$0.16 / kWh Natural gas: \$1.04 / therm	Grid Electricity: \$0.16 / kWh PPA Electricity: \$0.08 / kWh	Grid Electricity: \$0.16 / kWh PPA Electricity: \$0.08 / kWh Natural gas: \$1.04 / therm	Grid Electricity: \$0.16 / kWh PPA Electricity: \$0.08 / kWh
Energy Cost/ SF	\$0.16	\$0.14	\$0.32	\$0.71	\$0.89	\$0.71
Energy Cost	\$20,065	\$17,557	\$40,130	\$89,039	\$111,612	\$89,039
Maintenance Cost (CES)	\$22,573	\$22,573	\$28,217	\$22,573	\$28,217	\$22,573
Total First Year Cost	\$12.6M	\$15.9M	\$11.7M	\$13.0M	\$8.8M	\$10.2M
IRA 40% Geothermal Rebate	-	-\$5.2M	-	-\$5.2M	-	-\$3.9M
Potential Energize CT Incentive	-	-\$0.8M	-\$0.4M	-\$0.8M	-\$0.4M	-\$0.8M
First Year Net Cost	\$12.6M	\$9.9M	\$11.3M	\$7.0M	\$8.4M	\$5.5M

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# Central Middle (Greenwich, CT)

## LIFE CYCLE COST ANALYSIS

- Escalation Rate: 1.5%
- Inflation Rate: 2.3%
- Nominal Discount Rate: 5.5%
- Real Discount Rate: 3.13%

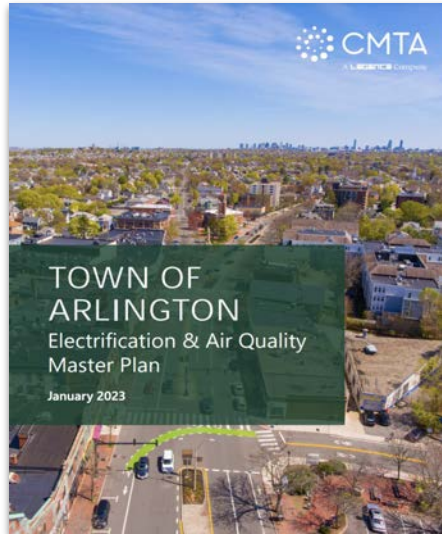
50 Years	Base Case	Alt 1 Geo	Alt 2 VRF	Alt 1 w/PPA PV	Alt 2 w/PPA PV	Alt 1 w/PPA PV & Geo
HVAC Cost (Turner)	\$9.6M	\$12.9M	\$8.6M	\$12.9M	\$8.6M	\$9.8M
PV Cost	\$3.0M	\$3.0M	\$3.0M	-	-	-
Geothermal PPA Cost	-	-	-	-	-	\$7.7M
Energy Costs	\$2.9M	\$2.5M	\$5.8M	\$12.8M	\$16.6M	\$12.8M
Maintenance Cost (CES)	\$3.2M	\$3.2M	\$4.1M	\$3.2M	\$4.1M	\$3.2M
Replacement Cost	\$26.2M	\$25.0M	\$65.6M	\$17.4M	\$58.0M	\$17.4M
Potential Rebate	-	-\$6.0M	-\$0.4M	-\$6.0M	-\$0.4M	-\$4.7M
<b>Total 50yrs Cost</b>	<b>\$45.M</b>	<b>\$40.7M</b>	<b>\$86.6M</b>	<b>\$40.4M</b>	<b>\$86.3M</b>	<b>\$46.2M</b>
<b>Net Present Value</b> (Compares initial investment and return)	-	<b>\$3.0M</b>	<b>-\$6.9M</b>	<b>\$5.4M</b>	<b>-\$4.5M</b>	<b>\$3.1M</b>

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# GSHP lowest first cost in retrofits, too!

## Arlington, MA



See details [here](#)

## Hadley, MA



See details [here](#)

# What is Direct Pay (aka Elective Pay)?

The IRS mechanism through which non-taxable entities (like schools!) convert tax credits to cash reimbursements.



## DIRECT PAY THROUGH THE INFLATION REDUCTION ACT

CLEAN ENERGY

<https://www.whitehouse.gov/cleanenergy/directpay/>



**What is elective pay?**  
Elective pay allows eligible entities, including tax-exempt and government entities that would otherwise be unable to claim certain credits because they do not owe federal income tax, to benefit from some clean energy tax credits. By choosing this election, the amount of the credit is treated as a payment of tax and any management will result in a refund.

**Who is eligible?**  
Applicable entities can use elective pay. Applicable entities include tax-exempt organizations, states and political subdivisions such as local governments, Indian tribal governments, Alaska Native Corporations, the Tennessee Valley Authority, trust electric cooperatives, U.S. territories and their political subdivisions, and agencies and instrumentalities of state, local, tribal and U.S. federal government.

**What types of businesses are eligible?**  
Generally, only "applicable entities" are eligible for elective pay. "Applicable entities" are defined as all of the clean energy tax credits. Specifically, other taxpayers that are not "applicable entities" may only use elective pay to treat as if applicable credit properly going to the:

1. The section 45Q credit (only for carbon oxide sequestration),
2. The section 45L credit (only for production of clean hydrogen), or
3. The section 45D credit (advanced manufacturing production credits). There are additional rules for the taxpayer as a partner or S Corporation.

**How do I make the elective payment election?**  
Eligible entities must claim and make an elective payment by making an elective payment election on their annual tax return along with any form required to claim the relevant tax credit. However, there are steps leading up to this, such as a required pre-filing registration process. An IRS 750 is required to complete the pre-filing registration process.

**Electronic return filing is strongly encouraged.**

**What tax credits can elective pay be used for?**  
See Publication 5817 for a list of tax credits that can be used for elective pay.

**Resources**

- [Elective Pay and Taxability](#)
- [irs.gov/electivepay](#)

**Publication 5817-09-2025, Circular Number 5817-01, Department of the Treasury Internal Revenue Service. www.irs.gov**

<https://www.irs.gov/pub/irs-pdf/p5817.pdf>



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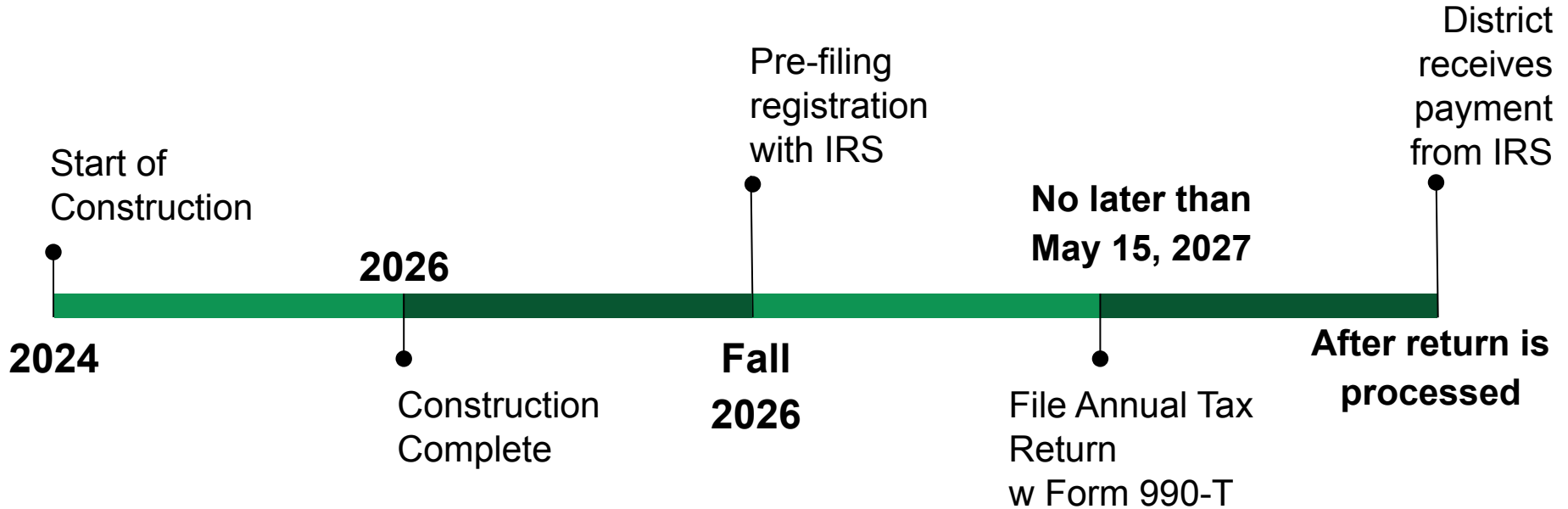
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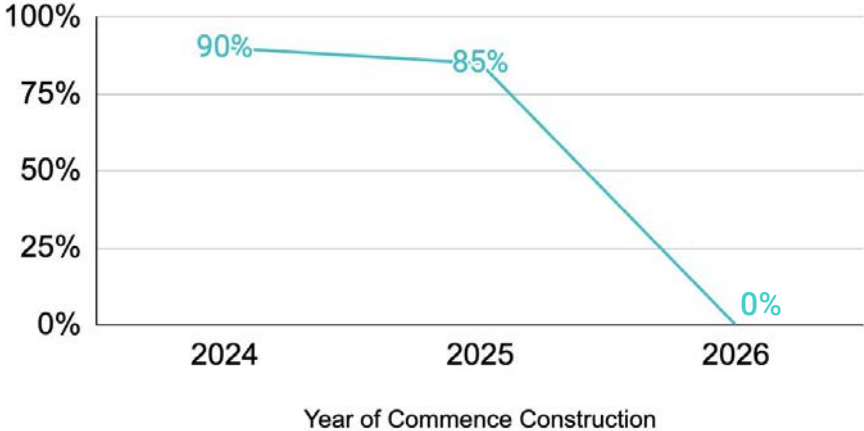
# When will the school district receive payment?



# Domestic content & Direct Pay

For projects over 1MW that commence construction in 2024 or later, meeting the domestic content thresholds will be required to receive the full amount of the credit through Direct Pay.

Percent of Direct Pay payment received if domestic content requirements not met **and project is > 1MW-ac**



<https://www.bluegreenalliance.org/resources/making-clean-energy-tax-credits-deliver-for-the-public-a-user-guide-for-governments-schools-and-nonprofits/>



# Value of Setting Early EUI Target



# Energy Use Intensity (EUI) Review

(Total annual energy use (in kBtu) divided by building SF)

CONSUMPTION = EUI

-  Lighting
-  Space Cooling
-  Space Heating
-  Hot Water
-  Fans & Pumps
-  Appliances & Electronics

PRODUCTION



CONSUMPTION = EUI

-  Lighting
-  Space Cooling
-  Space Heating
-  Hot Water
-  Fans & Pumps
-  Appliances & Electronics

PRODUCTION

