H. 871
School Construction Aid & Performance Contracting

Mike Davey
mdavey@eeiservices.com

Eric Lafayette
elafayette@eeiservices.com

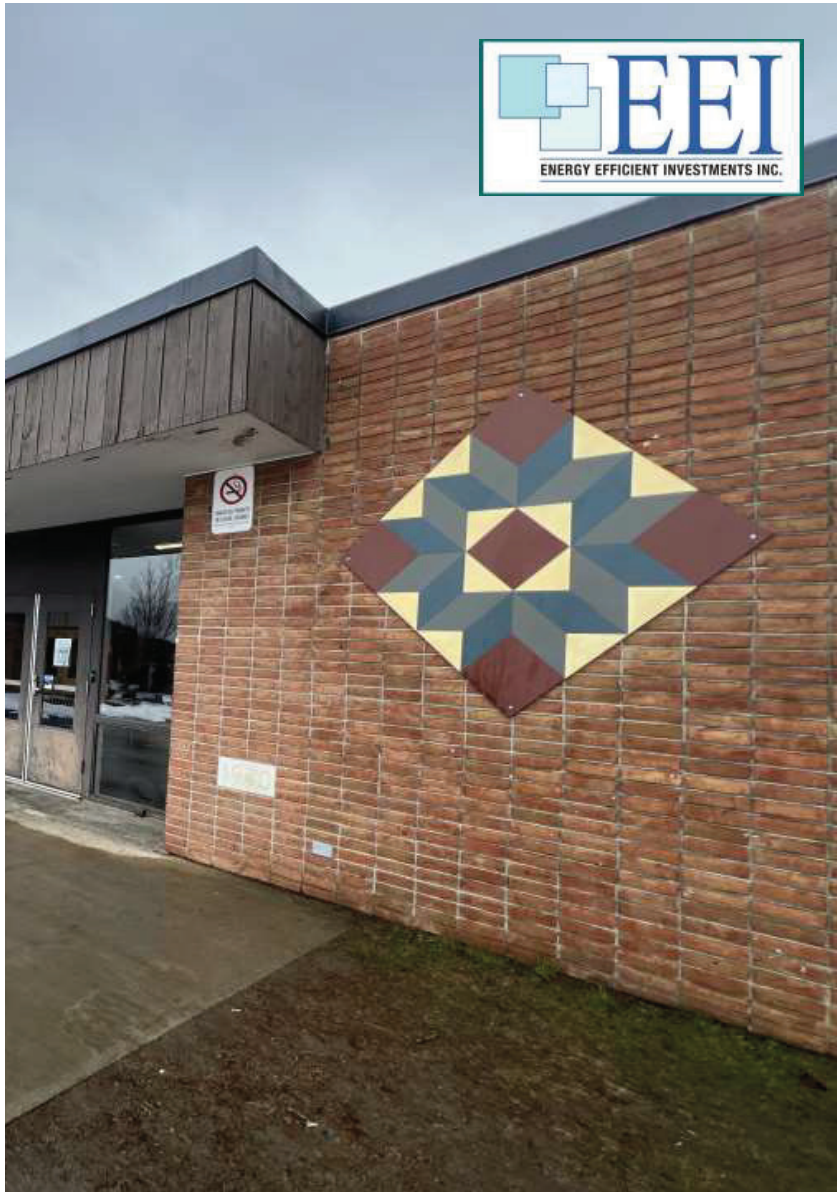
Eric Lafayette – Project Developer

- Project Developer
- Burlington, VT – BHS Grad of 06’
- Roger Williams University in Rhode Island majoring in Construction Management
- Live in So. Burlington w/ wife & two girls
- School Construction Aid Task Force

Why am I Here

H. 871 – School Construction Aid

- Advocate for Performance Contracting and its ability to address key infrastructure problems in the state affordably
- Delivery Methods for Schools
  - Currently Plan & Spec. & Construction Manager where an Architect leads the project planning
  - Looking at a model similar to Rhode Island



Who is EEI?

- ESCO (Energy Service Company) that provides “turn-key” energy services typically through performance contracting
  - Based in Merrimack, NH
  - Office in Williston, VT
- MUSH market
- efficiency & sustainability trying to utilize renewable energies
- Currently working at Springfield School District, Hannaford Career Center, Missisquoi Salley Supervisory Union, Burlington City & Schools, Barre School District, Two River SU, White River SU, Orleans

Why - Energy Performance Contracting?

- Financing & Grants
- Reduced Energy Cost
- Analytics
- Efficiency Vermont
- No Risk or Cost to Schools upfront
- Turn-Key Options w/ Guaranteed Results
- The best way to address infrastructure is through performance contracting.

Our Process

1. **Identify Options –**
2. **Review**
3. **Design**
4. **Procurement**
5. **Site Management**
6. **Commissioning & Guaranteed Savings**

EEI
ENERGY EFFICIENT INVESTMENTS INC.

LONG TERM RELATIONSHIPS

PARNTERS IN ENERGY

Options We Provide & Analysis

1. What is the fuel source of the future?
    - Oil, LP, Biomass, Geothermal, electric heatpump
2. Does the campus keep Steam or Convert to hot water?
    - Maintaining a Steam system means standard efficient boilers and a commitment to fossil fuel or biomass
    - Key infrastructure still needs upgrade but could reuse some boilers and building mechanical rooms
    - Do they stay on oil or propane – or move away from fossil fuels
3. How far do we take the energy upgrades, and where does it go?
4. Should we change the lights to LED?
5. What additional code or capital needs do we need.
6. Phase Approach

Franklin Elementary School, VT – 2022
- Oil to LP w/ Condensing Boilers

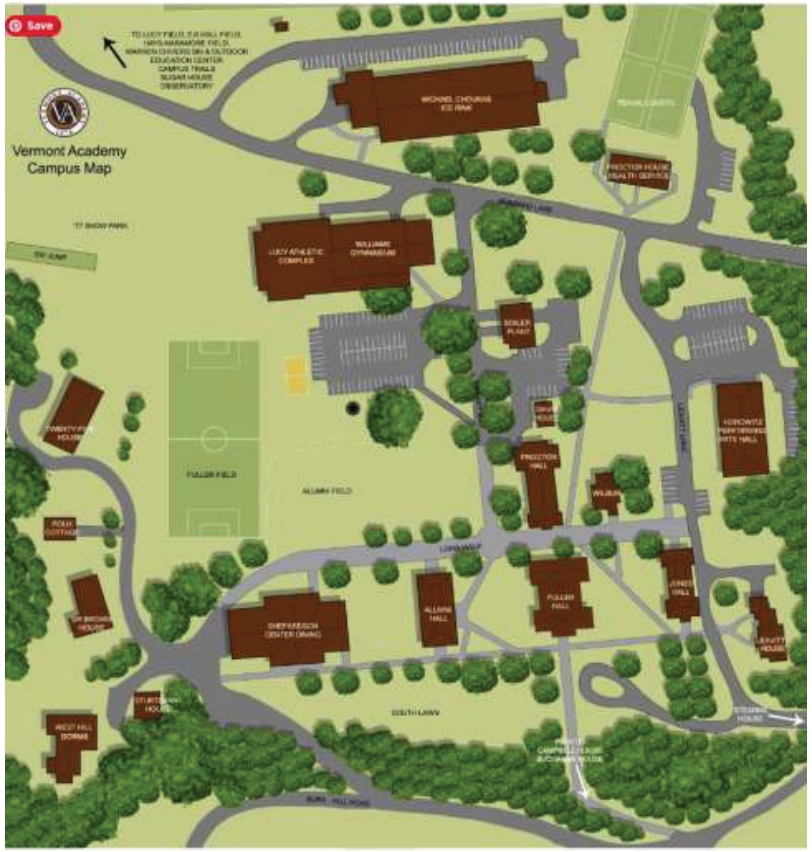
Existing Situation

- Vermont Academy primarily uses (2) steam boilers to provide heat to the campus
- This is accomplished through underground steam & condensate lines that connect most major buildings on campus
- Steam to Hot Water
- Different options on site

Typical Dorm

- Existing buildings have heat exchangers and condensate returns per the pictures attached.
- The age & infrastructure shown in the pictures is “typical” of the dorm halls

Existing Situation



- Most smaller outbuildings including West Hill Dorms, Sturtevent, the cottage and houses have individual heating systems
- The campus utilizes Oil as fuel source with standard efficient boilers. Campus oil use was is approximately 80,000 gallons/year
- Boilers have some useful life but the steam infrastructure that distributes the heat and returns the condensate to the boiler plant is past its useful life and failed in many instances

4 Situations at Play

1. There own heating systems
2. Heated by Steam
   - Shepardson
3. Currently heated by steam and conected to district steam (does not have its own boiler)
4. Hot water buildings that currently utilize the steam with a heat exchanger to heat building

Option 1 – Add Biomass Steam Boiler

1. Offsetting the 80,000 gallons of oil a year w/ wood chips
2. Addresses the high cost of oil & CO2 output (biomass is considered CO2 neutral)
3. Does not address all the infrastructure issues on the campus
4. Provides the greatest initial cost reduction
5. Keeps the building operating a distribution system that is pass its useful life

Initial Cost $1,800,000

Annual Fuel Savings: $150,000 / Year

Timeline: Build summer/fall of 2024

Low Cost / High Return w/out Address Key Issues

Option 2 – Add Biomass and Update Distribution System

1. Similar to Option 1 – but address infrastructure concerns on campus
2. Keep oil backup boiler & add new steam biomass boiler
3. Keep steam on the campus but replace all the distribution piping & building infrastructure
4. Keeps the building operating a distribution system that is pass its useful life
5. Distribution infrastructure has 50 year life expectancy, so the campus

Initial Cost $3,700,000

Annual Fuel Savings: $180,000 / Year

Timeline: Design 2024 & Build in 2025/26

- 2.5 year project between preconstruction & construction

Low Cost / High Return w/ Infrastructure

Option 3 – Add Biomass, Condensing Boilers & Hot Water Distribution

1. Removes oil from the campus and converts propane as backup & shoulder season
2. All new infrastructure with 40+ year life expectancy on major equipment
3. Utilize a low cost – carbon neutral product as your primary energy source

Initial Cost $5,400,000

Annual Fuel Savings: $200,000 / Year

Timeline: Design 2024 & Build in 2025/26

- 2.5 year project between preconstruction & construction

All new infrastructure – long term capital plan

Option 4 – Move off Central Distribution System and Add Boilers & LP tanks to each building

1. Addresses key infrastructure problems to the distribution system (eliminates it)
2. Reduces boiler sizes meaning parts are easier to source & more people work on them
3. Creates additional redundancy around the campus
   (More boilers to maintain)
4. 20-year infrastructure projects
5. Provides the greatest initial cost reduction
6. Keeps the building operating a distribution system that is pass its useful life

Initial Cost $4,500,000

Annual Fuel Savings: $45,000 / Year

Timeline: This could be a phased approach, where we start addressing the worst infrastructure building first and tackle the projects over a period of time

Pre-Construction Project Schedule

1. **January 2024** – Present to board magnitude of cost and options

2. **End of April 2024**
   - Provide Schematic design with updated pricing
   - Present to board with progress update
   - Discuss potential construction scheduling with phasing

3. **End of May 2024** – Finalize project scope and sign design contract

4. **Spring 2024 – End of 2024** – Design, Permitting, & Grant Applications

5. **Spring 2025 – Mid 2026** – Construction and Building Conversion

6. **October 1st, 2026** - Building turnover and commissioning

ECM Matrix

ECM Matrix - Vermont Academy

			Cost	Savings	Eff. VT
ECM 1	Option 1 - Add biomass steam boiler		$1,800,000	$150,000	$100,000
ECM 2	Option 2 - Biomass and Update Distribution		$3,700,000		
ECM 3	**Option 3 - Biomass, Condesing Boilers, & Hot Water**		**$5,400,000**	**$200,000**	**$100,000**
ECM 4	Option 4 - Individual Boiler Rooms Per Building		$4,500,000	$45,000	
ECM 5	**DDC Controls - Campus Control Upgrades**		**$1,100,000**	**$30,000**	**$50,000**
ECM 6	**LED Lighting Upgrades (Halls, Horowitz, Lucy, Wilbur, Davis)**		**$800,000**	**$72,000**	**$35,000**
ECM 7	**Shepardson Steam to Hot Water Conversion**		**$450,000**		
ECM 8	**Williams Steam to Hot Water Conversion**		**$400,000**		
ECM 9	Integration of Houses & Cottages not currently on System		$700,000		
ECM 10	Building Ventilation		$0		
ECM 11	Building Envelope & Insulation		$0		
		Total Project Costs	**$6,400,000**	**$302,000**	**$185,000**
		Owners Contingency (3%)	$192,000		
		Total Budgeted Project Costs	$6,592,000		
		Less Rebates & Eff. VT	$185,000		
		Total Amount	**$6,407,000**		
		Payback	**21.22**	Years	

Biomass Wood Chip Boiler

- Cheaper Fuel Source
- Reduction of CO_2
- 80% of cost stays within a 60-mile radius
- 40-year infrastructure investment
- Renewable energy source

LED Lighting

The campus primarily uses fluorescent lighting. Significant energy savings can be accomplished be converting lights to LED.

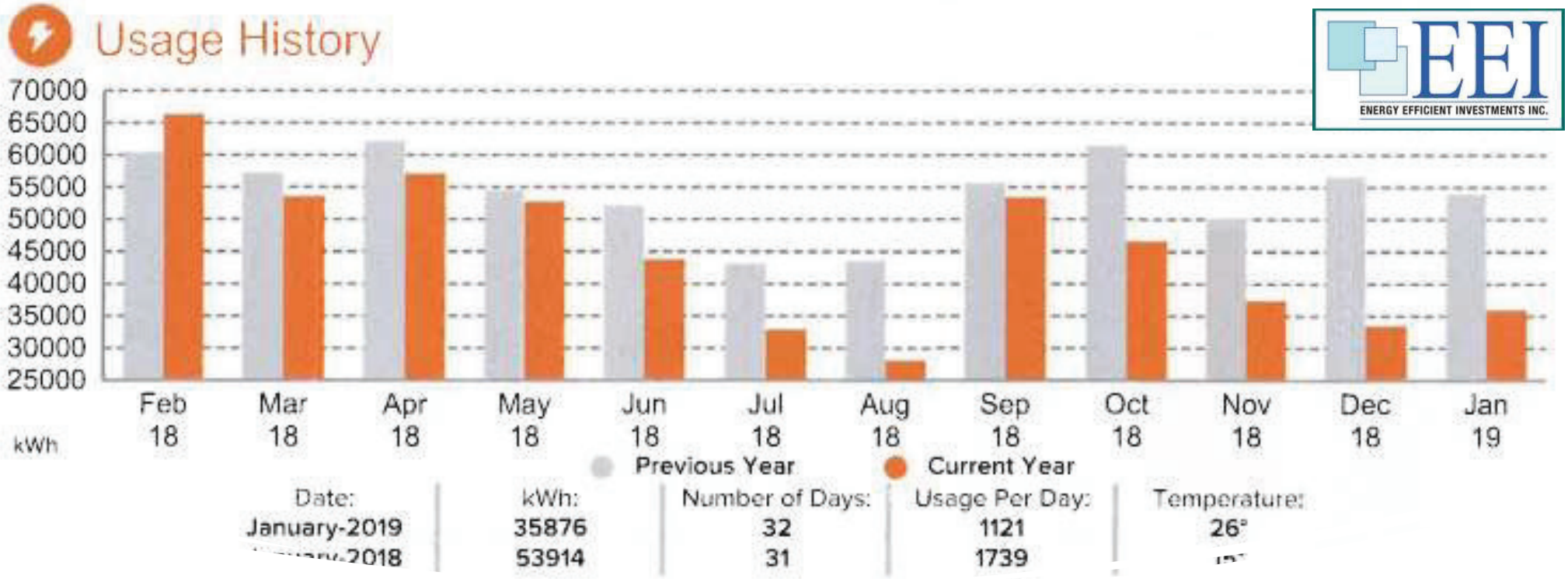
BENEFITS of LED

- 75% energy savings compared to traditional lighting systems
- Dimming capabilities, automated scheduling, and occupancy sensors allow for efficient use of lighting resources, saving energy during periods when classrooms are unoccupied.
- Can help to reduce fatigue and eye strain of students
- Improve overall ambiance of the learning environment

Financing & Project Funding

Financing & Grant Opportunities

- **Lease** - Ability to obtain leases for school improvements. Renewable energy and efficiency projects could be eligible for 10 year – 2% interest funding through the USDA.
- **Financing / Donor Contributions?**
- **Inflation Reduction Act –** The IRA will pay non tax paying entities 30% of the project costs for geothermal & solar projects
- **Efficiency Vermont –** Rebate programs are changing and a custom incentive will be applied for once the owner selects measures they would like us to investigate
- **State & Federal Grants –** EEI applies & helps school districts apply for state & federal grants



Case Study #1 – Addison Northwest SU

Looking For

1. Performance contracting be eligible for school construction aid. So if a district wants to receive state aid for specific infrastructure improvements, it should be part of the financing mix
2. Energy Use Index (EUI)
3. Energy & Climate Change

Thank You

Eric Lafayette

Project Developer / Manager

elafayette@eeiservices.com