CENTURY CENTER ENERGY AUDIT SUMMARY

Full Century Center Energy Audit Report

Rationale for Energy Audits

Asset Management

- What do we have?
- Where is it?
- What condition is it in?
- How much energy does it use and what are the carbon emissions?

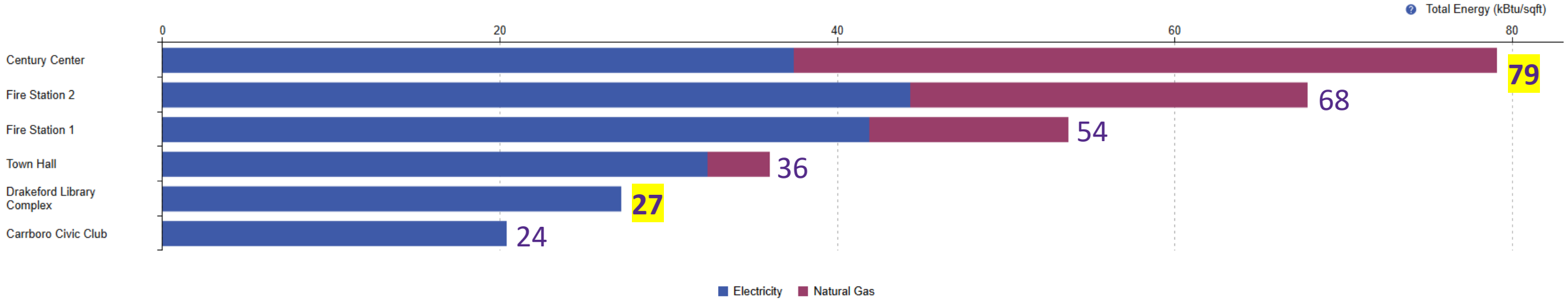
Identify Carbon Reductions

- Strategies to lower energy use and reduce carbon emissions
- The associated costs of those strategies

Justification for New Town Hall – High-Performance LEED Gold Rebuild

- Financial & Environmental
- Limiting factors for Energy Conservation Measures (ECMs)

2025 Energy Use Intensity (EUI)



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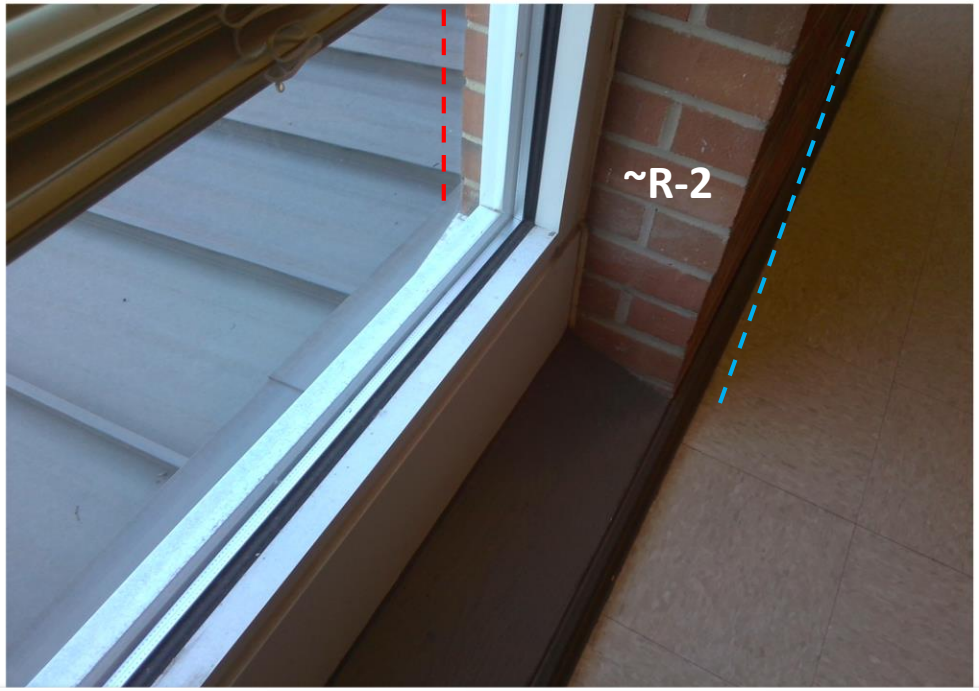
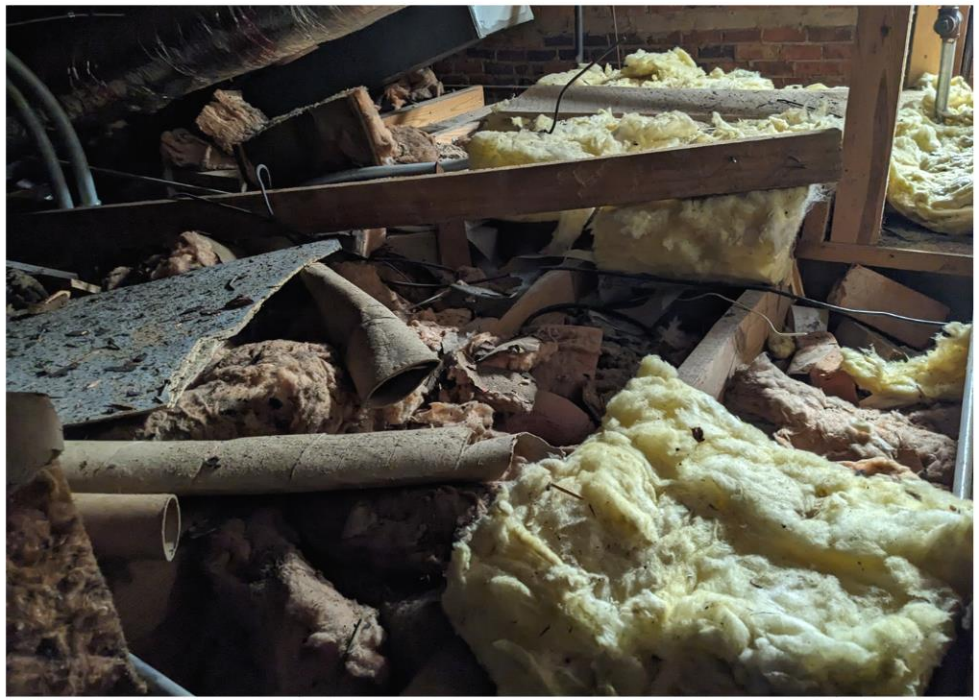




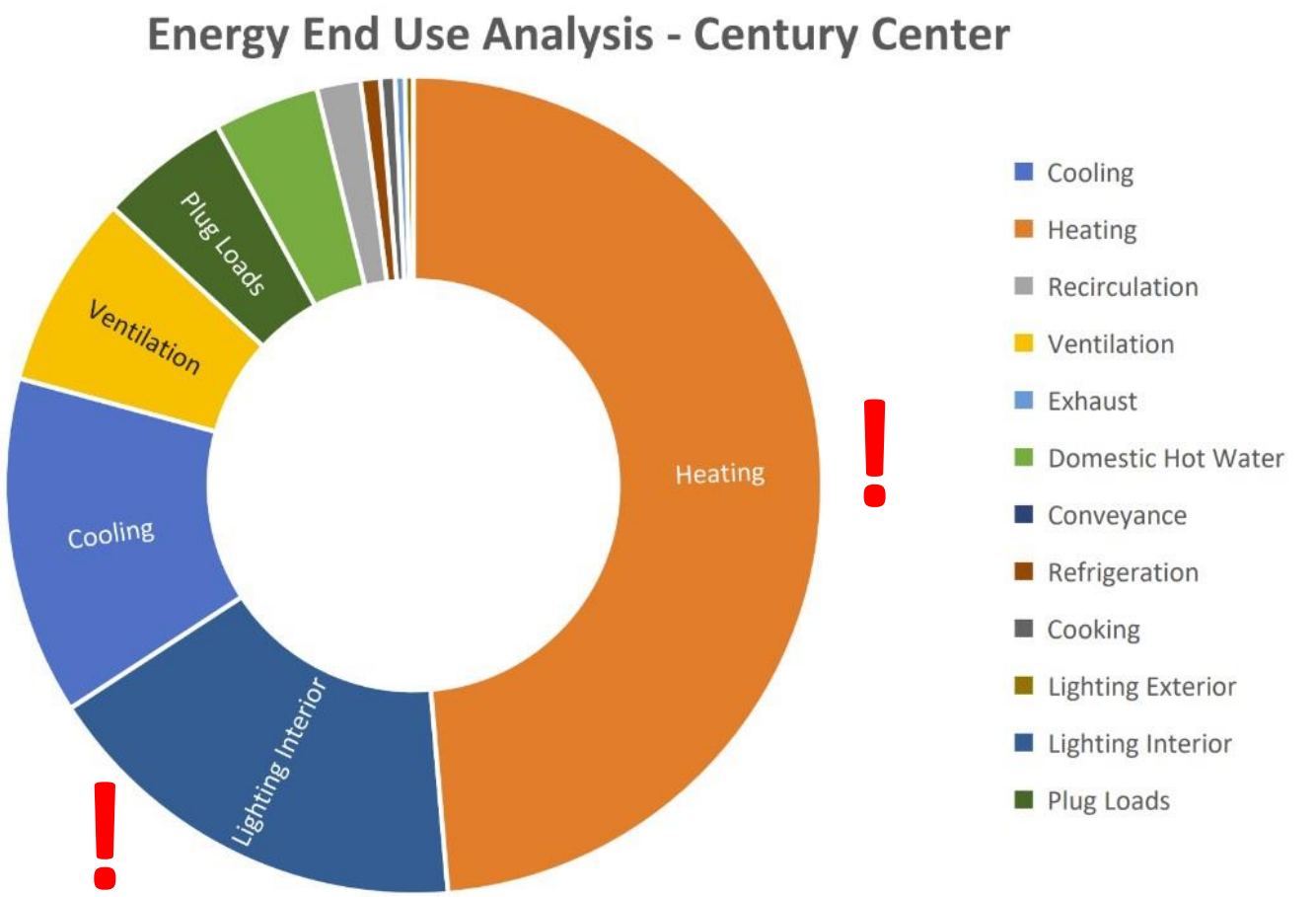
Limiting Infrastructure Issues

Electrical infrastructure for the building is at capacity. Restricts electrification retrofits.

Walls are structural brick with no insulation. Addition of insulation would require new internal framing.

Minimal roof insulation.

The police headquarters roof will need to be replaced before a solar array can be added.



Data based off 2023-2025 utility bills

The stories behind the slices

Heating

- Significant heat loss due to missing or insufficient insulation
- Substantial air leakage
- 2025 – *"excessive usage for a system that is mainly just for domestic hot water in the summertime and VAV* reheating."* Refers to extremely high use during May-Aug.

Lighting

- Theater lights have not been transitioned to LEDs

Water Heating

- Both gas water heaters are from 1999 and appear in poor condition

*Variable air volume (VAV) is a type of heating, ventilating, and/or air-conditioning (HVAC) system that regulates airflow to different zones in a building to meet specific heating or cooling demands. Unlike constant air volume (CAV) systems, which supply a constant airflow at a variable temperature, VAV systems vary the airflow at a constant or varying temperature.

Carrboro Century Center: Proposed Energy Conservation Measures (ECMs)

ECM Code	Technical Upgrade Name	What It Actually Means
ECM-L1	Advanced HVAC Controls	**Installing automated software to synchronize the heating and cooling setbacks specifically with the variable schedule of the Century Hall rental space, rather than running it constantly.**
ECM-L2	Retro-commissioning	**Testing, repairing, and recalibrating the existing HVAC system controls. This is to fix the major operational glitch where the building uses 50% of its energy on heating and runs heating cycles during the summer.**
ECM-L3	Attic Insulation	**Installing an additional 3.5 inches of R13 blown-in insulation across the 5,000-square-foot attic above Century Hall to stop expensive conditioned air from escaping through the roof.**
ECM-L4	PTAC Replacement	**Replacing the outdated ductless mini-split AC unit in the telecom room. The recommendation is to wait until it naturally breaks rather than replacing it immediately, as the immediate financial payback is low.**
ECM-L5	Domestic Hot Water Replacement	**Removing the failing 1999 gas water heaters. They will be replaced with tankless gas heaters for the rental halls and a high-efficiency electric heat pump for the police station (Note: Requires ECM-H3 first).**
ECM-M1	Engineering Study	**Hiring professionals to conduct a full architectural, mechanical, electrical, and plumbing survey. Because it's a 1924 building with multiple renovations, the Town lacks blueprints and needs to map what is behind the walls.**
ECM-H1	Lighting System Replacement	**Ripping out the deteriorated 1999 fluorescent T-8 light fixtures and replacing the entire building with a modern LED lighting system to drastically reduce the electrical load.**
ECM-H2	Solar PV Installation	**Installing a 40-kW solar panel array on the roof of the police station wing to generate renewable electricity directly on-site (Note: Requires ECM-H3 and a roof replacement first).**
ECM-H3	Service Upgrade to Include Sub Metering	**Ripping out the maxed-out main electrical panel and installing a much larger 1200-Amp switchgear, plus four smart meters. This doesn't save energy, but it builds the necessary electrical capacity to support modern technology like solar panels and heat pumps.**

Century Center 2025 Emissions - **212 $MTCO_2e$**

"It is conceivable that perhaps 20% to 40%, but not 100%, of this total is a realistic outcome when implementing all ECMs."

Estimated Emission Reductions

100%: 58.5 $MTCO_2e$

40%: 23.4 $MTCO_2e$

20%: 11.7 $MTCO_2e$

New Town Hall – High-Performance LEED Gold Rebuild

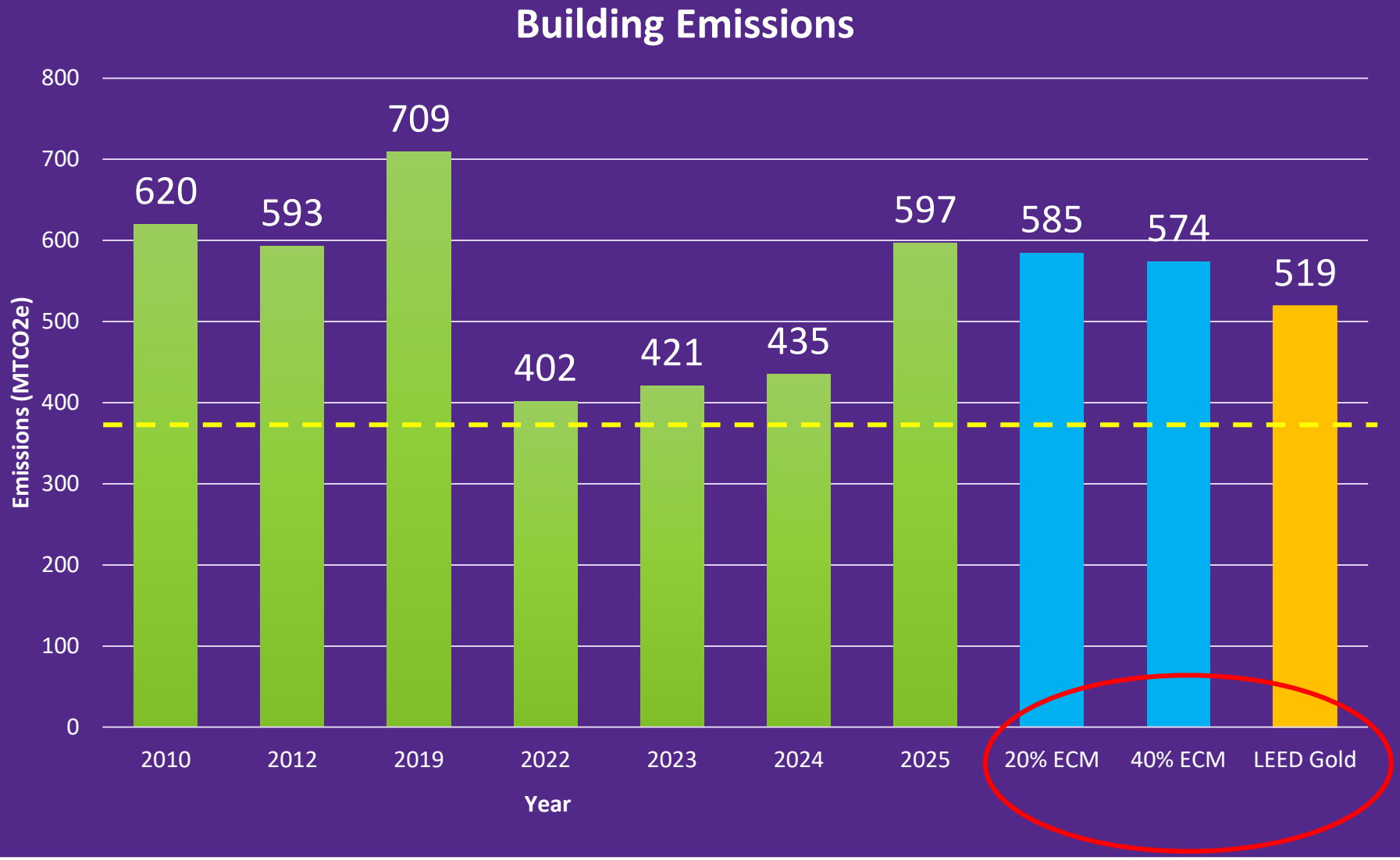
LEED Gold ROI

- LEED Gold Premiums – costs associated with meeting LEED standards.
  - Additional **2% – 8%** to total construction costs
  - ROI within **3 – 7 years**

Additional Benefits

- The Century Center has significant “unused” space. Space optimization can further improve efficiency.
- Improved Indoor Air Quality (IAQ), which improves occupant health
- Energy Consumption reductions of **25% - 40%**
- Water Consumption reductions of **11%**

Comprehensive Plan – 80% reduction in municipal emissions



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Final Thoughts

✓ Century Center has the highest use of natural gas

- 1 kg CO_2e/sqft more than the next building

✓ 82% more energy use than a similarly sized building

- 2025 Energy Use Intensity (EUI): Century Center – 80 kBTU/sqft | Drakeford – 27 kBTU/sqft

✓ Infrastructure & structural issues reduce effectiveness of ECMs

- **Realistic carbon reduction – 11.7 - 23.4 $MTCO_2e$**

✓ LEED Gold Rebuild- High-Performance Building Policy

- LEED Gold annual Energy Use Intensity (EUI) target for office buildings – 30 - 45 kBTU/sqft
- **Estimated emission reduction – 54 - 101 $MTCO_2e$ (all electric)**

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Questions?

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Energy Conservation Measures

Investment represents the initial financial investment:
High investment – High initial cost

Saving represents the ongoing financial return:
High saving – Large amounts of money saved per month

Payback represents the amount of time required for the saving to offset the initial investment:
High payback – It will take many years to make up initial cost

ID	Description	Investment	Savings	Payback
ECM-L1	Advanced HVAC Control Software for Century Hall	Low	Low	Medium
ECM-L2	Retro-commissioning Focused on Excessive Heating Issue	Low	Medium	High
ECM-L3	Install Attic Insulation	Low	Medium	High
ECM-L4	Replace PTAC-2	Low	Low	Low
ECM-L5	Domestic Hot Water System Replacement	Low	Medium	Medium
ECM-M1	Engineering Study to Develop Existing Construction Plans	Low	None	None
ECM-H1	Lighting System Replacement	High	High	Medium
ECM-H2	PV System Installation	High	High	Low
ECM-H3	Service Upgrade to Include Sub Metering	High	None	None

ROI's

100%: 17.4 years

40%: 43.4 years

20%: 86.8 years

Estimated Emission Reductions

100%: 58.5 MTCO2e

40%: 23.4 MTCO2e

20%: 11.7 MTCO2e

Cost Breakdown

"It is conceivable that perhaps 20% to 40%, but not 100%, of this total is a realistic outcome when implementing all ECMs."

[-] ID	[$] ProposedCost	[$/y] Savings
Baseline		
ECM-L1	$3,681.07	$739.79
ECM-L2	$9,766.75	$6,967.19
ECM-L3	$2,966.04	$739.79
ECM-L4	$3,389.76	$62.05
ECM-L5	$6,345.21	$738.04
ECM-M1	$10,586.64	N/A
ECM-H1	$98,430.79	$3,388.01
ECM-H2	$93,218.40	$3,370.58
ECM-H3	$49,609.67	N/A
Total	**$277,994.32**	**$16,005.45**

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