

2019 RMA/WCUPPA Conference  
Reaching New Heights in Energy Performance  
Contracting Through Student Engagement  
September 17<sup>th</sup>, 2019

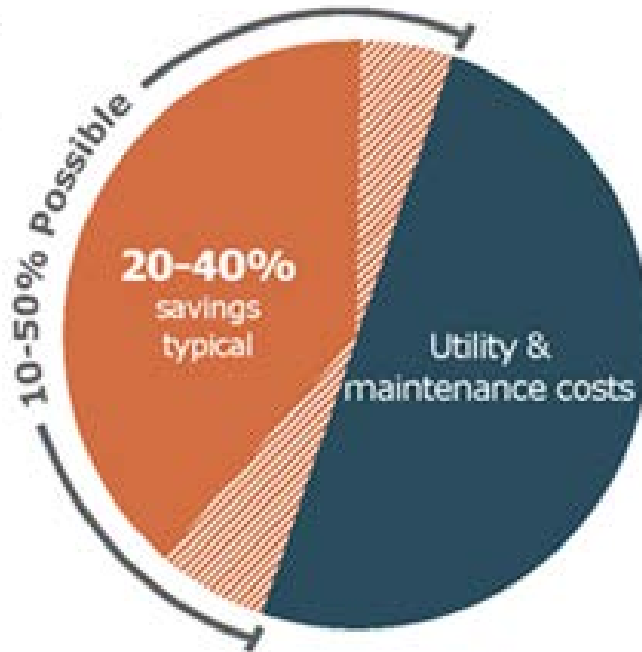
# Presentation Agenda

1. Energy Performance Contracting Overview
2. Project Summary
3. Student Engagement through powerED
4. Project Benefits
5. Questions

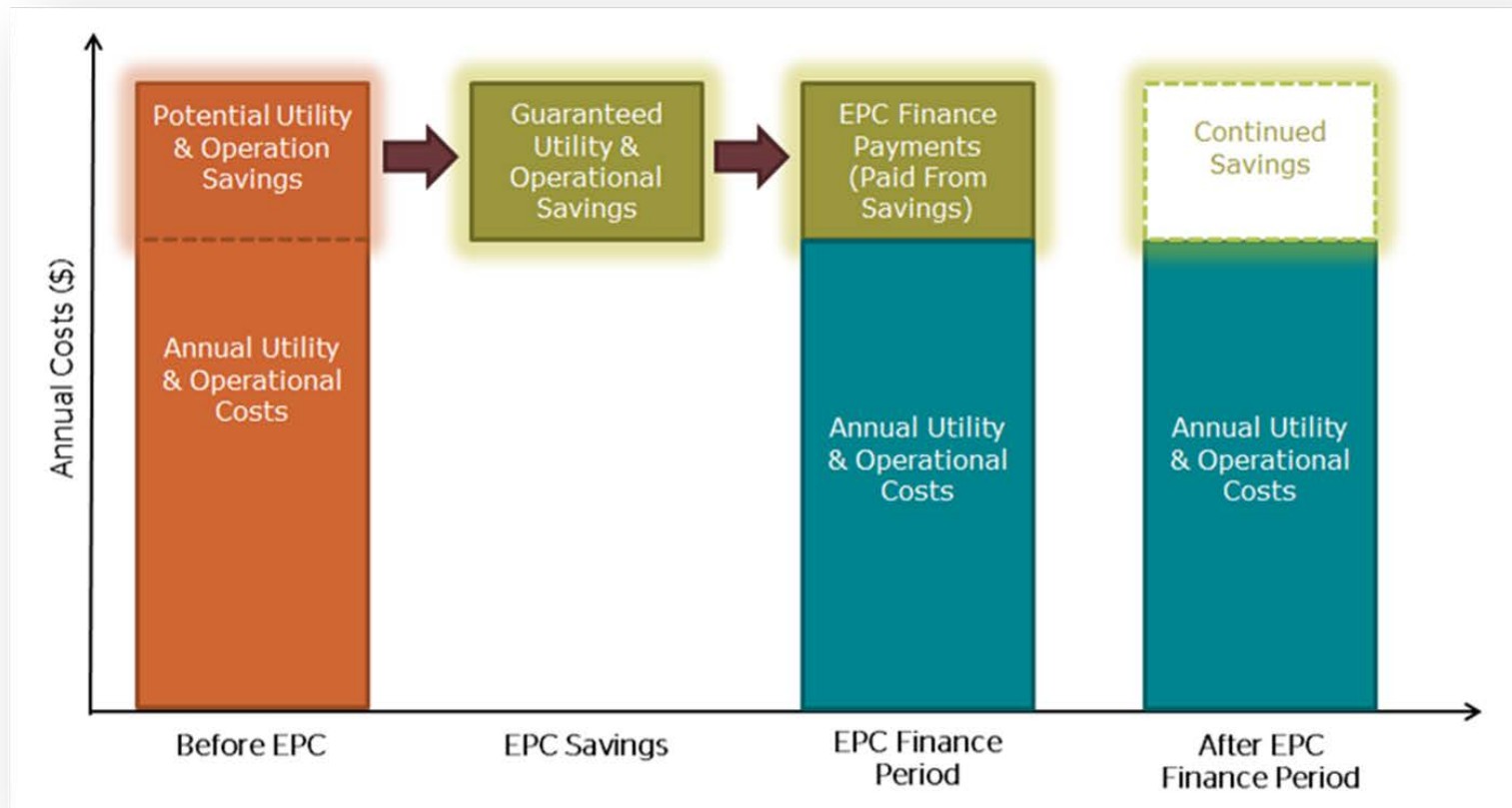
# What is Energy Performance Contracting or EPC?

*“An innovative contracting mechanism which provides the funding for facility improvements today through future utility and operational cost savings”*

- Energy Services Coalition



# EPC Funding Overview



# EPC Project Goals



\$4.8M maximum project cost



10 year simple payback target



Campus-wide powerED program



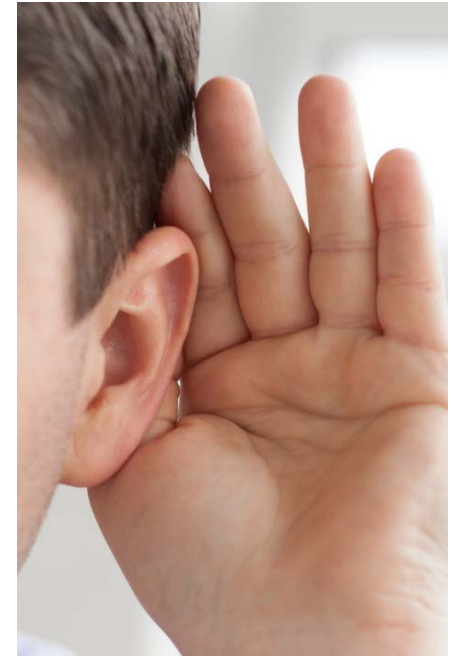
Include solar PV



Implement targeted LED upgrades



Fund other HVAC and mechanical measures



# EPC Project Summary

Category	Amount
Project Cost	\$4.8M
Guaranteed Annual Savings	\$446K
Estimated Rebates	\$94K
Simple Payback	10.8 Years*
Annual CO2 Savings	4,401 Tons

***\*Note: project generates a positive cashflow in year 10***



# Three Methods to Increase Energy Efficiency



Capital  
Upgrades



Optimized  
Operations



Engaged  
Occupants

# powerED Program

Occupant  
Engagement



Optimized  
Operations



Performance  
Tracking



The powerED measure consists of reducing energy use through ongoing commissioning, performance reporting, occupant engagement, and automated data analysis of your facilities.

- 3-year program (April 2018 – July 2021)
- 32 buildings (campus-wide approach)
- People module: occupant engagement, Mines branded campaign and website
- Process module: ongoing Cx, operational improvements, quick-payback recommendations
- Performance module: reporting and analysis of utility data, and savings compared to a weather adjusted baseline

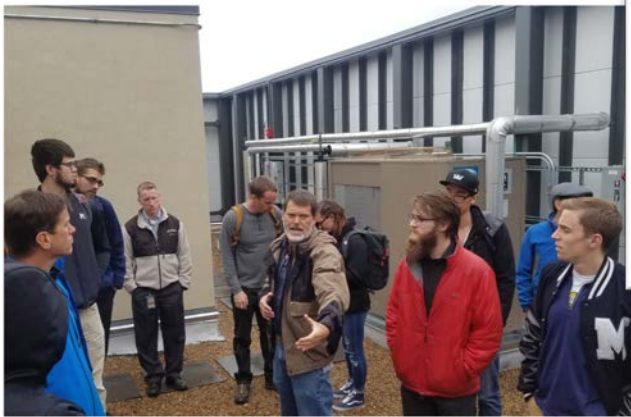


# powerED Goals

- Improve campus sustainability and integrate current practices with powerED including student engagement and communication
- Leverage program for student recruitment/retention
- Ensure Mines is living Earth|Energy|Environment tagline
- Progress tracking including goals and prior efforts
  - Link to AASHE STARS
- Connect to and promote through local sustainability efforts (City of Golden)
- Tie in research components through faculty/student work and grants
- Exceed guaranteed energy savings
- Improve system operation/reliability and address comfort issues

# People module activities

- Behind the Scenes Building Energy Use Tour
- Coal Display & Carbon Cube Demo
- People.Power.Planet website challenges and energy actions
- Sustainability Committee & Green Team Formation and Support
- Department, Class & Club Presentations
- Energy & Sustainability Survey
- Shut the Sash Campaign



# People module communications

- Press release
- 2 news articles and one radio interview
- Campus-wide email introducing campaign
- Social media
- Steering Committee Newsletter
- Sustainability Website Links
- Weekly Energy Tips in Daily Blast



## Colorado School Of Mines Includes Students In The Energy Efficiency Equation

By STEPHANIE DANIEL • AUG 31, 2018



Colorado School of Mines kicked off its powerED program with the help of the university's integrated energy and environmental sustainability center.

The Colorado School of Mines has launched a new awareness and savings program. PowerED will retrain students to be more efficient and teach students and staff how to conserve through online community engagement.

"We're training the next generation of scientists and engineers and so we want them to go out into the world and show them how energy and how people affect the energy use of buildings," said Lauren Poole, the sustainability coordinator for Mines.

### Sustainability

Posted: October 15, 2018

Colorado School of Mines students are flexing their creative muscle on a real-life challenge to work with Climax Molybdenum, a Freeport-McMoRan company, in envisioning innovative ways to repurpose the Henderson mine following the eventual depletion of the mineral resource, and the social and economic transition of the mine and surrounding communities.

"Mines is very excited about this new partnership and the opportunity for our students to grow and use their entrepreneurial skills on a real-world challenge in Colorado," said Priscilla Nelson, professor and head of the Mining Engineering Department.

The semester-long Henderson Sustainable Development and Entrepreneurship Challenge kicked off earlier this fall with 24 Mines student teams pitching concepts for the sustainable repurposing of the mine's surface facilities and properties. The students' initial proposals included everything from resorts, education and recreation to business development, data centers and ecological enhancement.

Located near Empire, Colorado, just below the Continental Divide, the Henderson mine is a significant economic driver for the region, paying a significant portion of property taxes collected in Clear Creek County. Student concepts were required to be economically sustainable, socially acceptable and environmentally friendly.



Employees selected the top 11 student teams to continue on in the challenge. Teams were then joined by Mines staff and Climax Molybdenum staff and the community.

The remaining teams will travel to Idaho Springs to present their ideas to a panel of judges and the community.

In addition to the presentation of their proposals to Clear Creek community members, Mines staff and Climax Molybdenum staff will award \$10,000 for third place will be awarded to the winning teams.

"The Colorado School of Mines and this challenge is another step in promoting collaboration with local communities and sustainability in the areas in which we operate," said Mike Kendrick, President-Climax Molybdenum.

The Colorado School of Mines is a professional university degree programs and is particularly important in preparing graduates for the workforce.

**STRONGER. FASTER. MORE EFFICIENT.**  
SAY HELLO TO THE HIDA FARGO HDP6600

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The Sustainable Campus (Trends and Innovations)

## An Energy Partnership

By Gary Bowersock, Alison Schwabe | September 1st, 2018

Colorado School of Mines (Mines) in Golden, CO, is known globally for the quality of its education, the success of its alumni, and its unique expertise in topics related to earth, energy, and the environment. The school is home to 10 sustainability-related research centers and institutes spanning energy and fuel cells to water pollution prevention and environmental risk assessment. Mines features six LEED Gold/Silver facilities and is pursuing LEED Silver/Gold on several new buildings and renovations.

# People and Process modules: Shut the Sash Campaign

- Marketing materials
- Environmental Health & Safety coordination
- Department meetings and buy-in
- Physical fume hood audits
- Fume hood sash data points
- Building analytics
- Green Team support



Be Safe. Save Energy.

## Shut the Sash



An open fume hood wastes **\$1,100** in energy per year – roughly the amount needed for an entire home.

Protect yourself, keep the hood as low as comfortable, and SHUT THE SASH when not in use.

Forget Something?

## Shut the Sash

**Be Safe. Save Energy.**

An open fume hood wastes **\$1,100** in energy per year – roughly the amount needed for an entire home.



Report any problems with fume hood closure or operation to Facilities Management.



Find more ways to save energy at  
[Mines.PeoplePowerPlanet.com](https://mines.peoplepowerplanet.com)



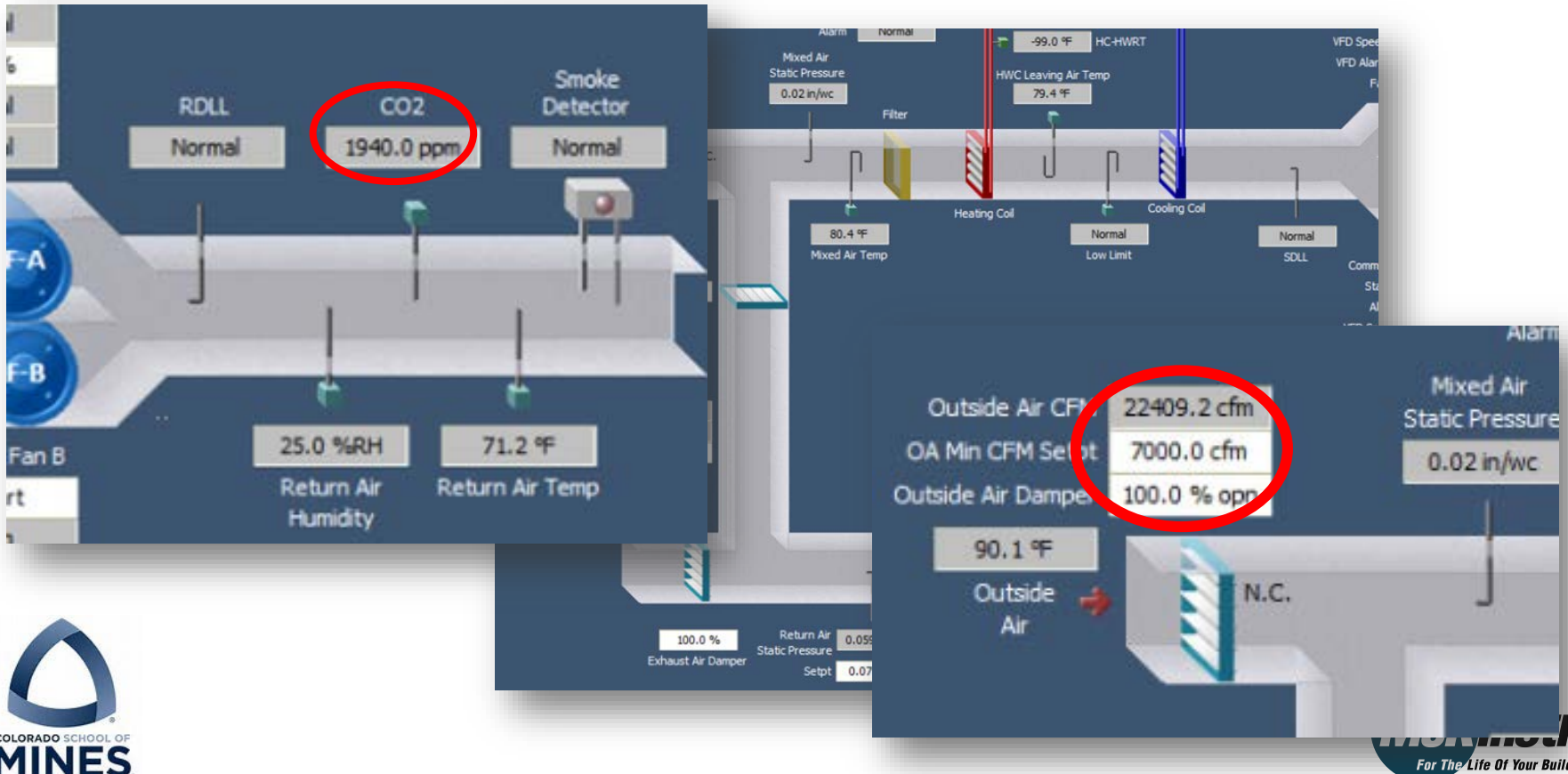
# Process module

- 162 savings opportunities identified during first year of the program
- 30 opportunities implemented or near complete at ~\$128K/yr in savings
- 84 additional opportunities identified and being pursued
- Conservatively ~\$80K+ in potential savings for these additional items
- Key opportunities implemented: sash closure, exhaust controls, OA control, snow melt controls
- Current focus: space temperatures, schedules, more exhaust control
- Annual savings goal for Year 1 is \$117K, Year 2 is \$234K



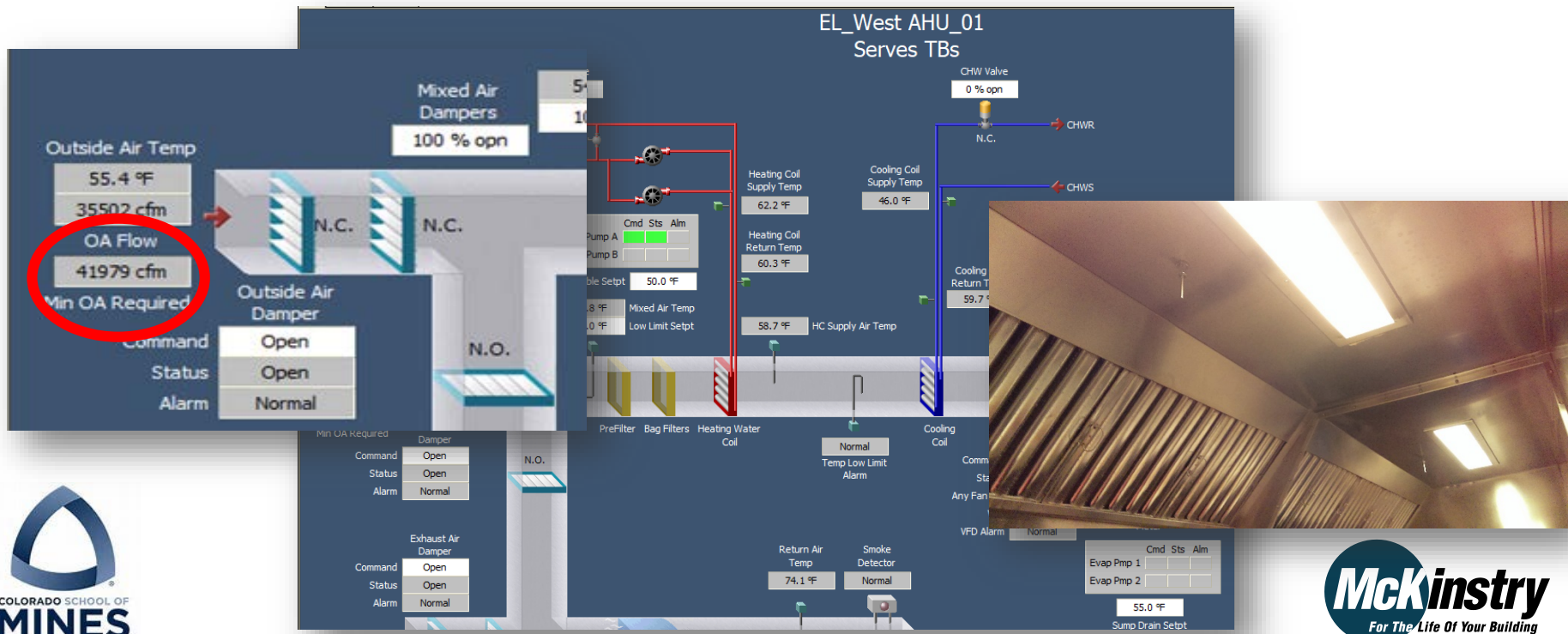
# Process module

- **Schedules & OA Control:** occupied schedule changes, OA damper repairs, and optimized ventilation control.
- **Ventilation Control:** failed CO2 sensor causing 100% OA



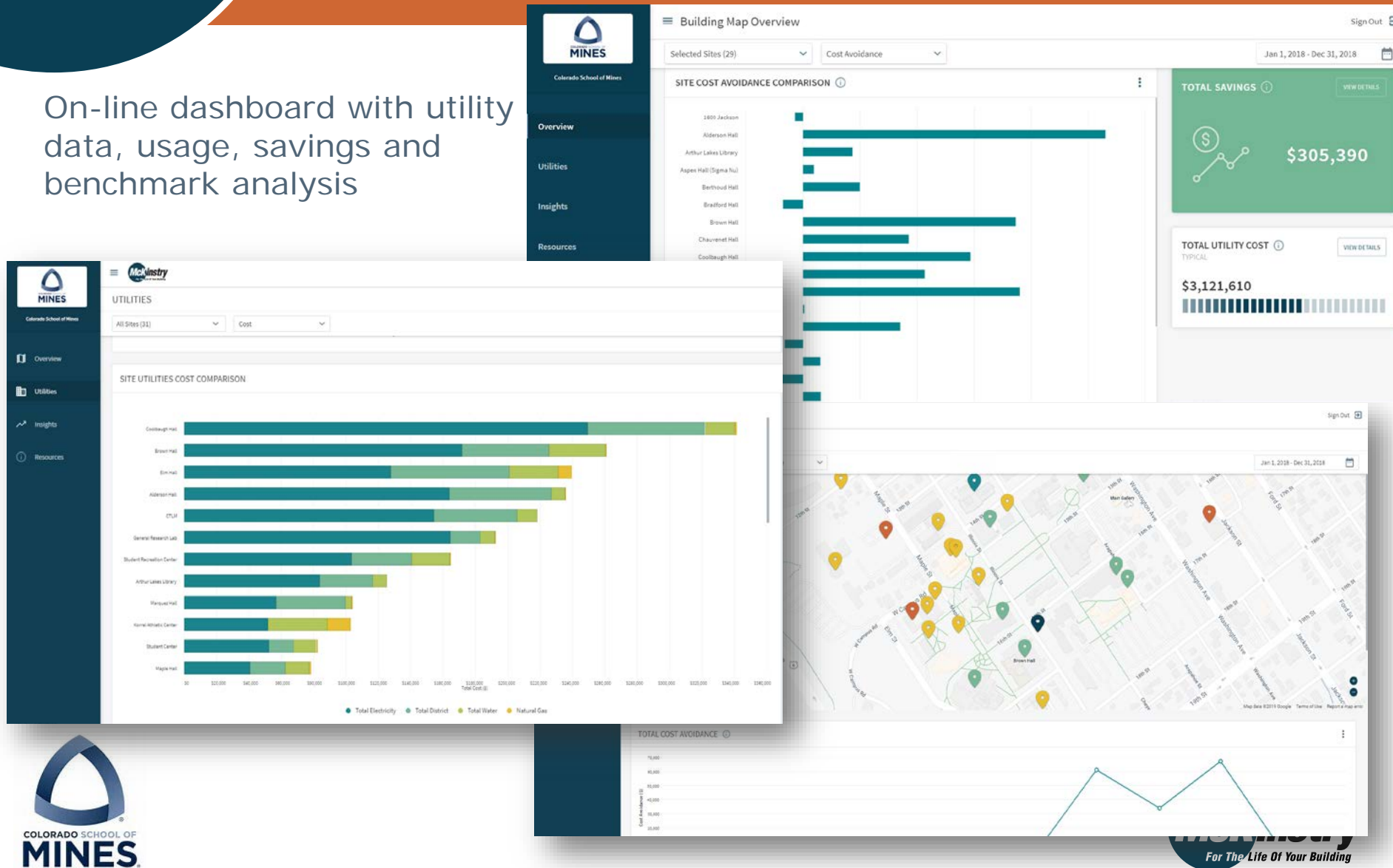
# Process module

- **Exhaust Control:** fix control of exhaust hoods, allow switching off at night
- **Sash Management:** data analysis of savings impact from sash management
- **Snow Melt Systems:** fixed snowmelt sensors to prevent operation
- **Chiller Plant Optimizations:** working soon on central chiller plant operation
- **Temperature Controls:** correct failed zone sensor keeping unit enabled 24/7



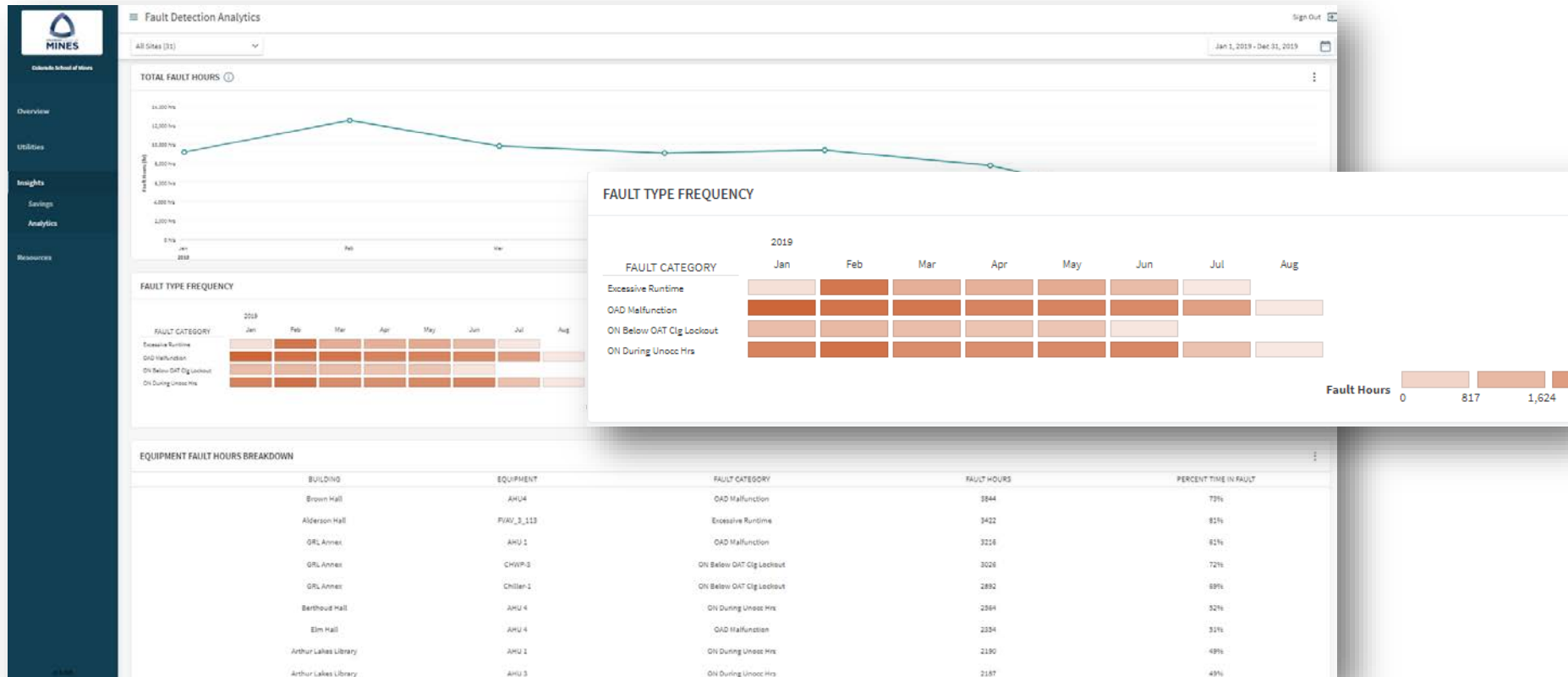
# Performance module

On-line dashboard with utility data, usage, savings and benchmark analysis



# Performance module

Full suite of building automation system data analytics visible on dashboard for facilities team to utilize



# EPC Project Benefits



*3 year powerED Program* to engage occupants & promote sustainability



Includes solar PV



Funds high priority capital projects and building efficiency measures



Meets financial targets



4,401 tons of CO2 reduction



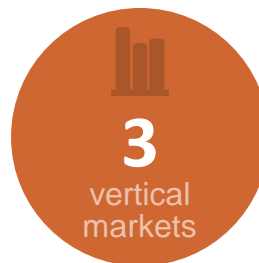
# powerED Program-wide Impact



2010 program  
launch



across the U.S.



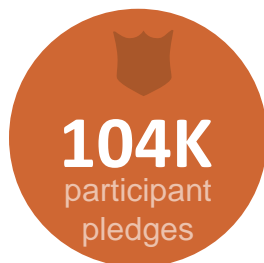
K-12, higher ed,  
& local  
government



People  
Process  
Performance



Rocky Mountain,  
Great Lakes, W.  
WA, South



to save energy  
& cut waste



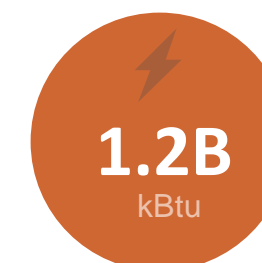
from all powerED  
clients



across all powerED  
programs



across all powerED  
programs



total energy saved  
across all powerED  
programs

# Thank You – Questions?

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