

Meeting Agenda (Conference call in details listed below)

8 November 2018

Colorado Energy Office – Main Conference Room

1580 Logan St., Suite 100, Denver, CO 80203

9:30 – 10:00	Networking
10:00	ESS Participants Call-In
10:00 – 10:15	Welcome & Introductions. Food for thought: Your district's interest/involvement in Federal, State, or Local grant, partnership, or support programs?
10:15 - 11:00	CEO Updates on ESS, Funding, EPC, ReNew Our Schools – Anna Kelly and Michael Turner
11:00 – 11:45	USGBC Updates – Patti Mason (LEED, Mesa Schools – Eric Anderson: recipient of Center for Green Schools Scholarship)
11:45 – 12:05	Lunch – Compliments of the Energy Services Coalition
12:05 – 1:05	Energy Performance Contracting – Carl Hurst, Energy Services Coalition & Mirka della Cava, Colorado Energy Office
1:05 – 1:15	Break
1:15 – 1:45	Colorado Department of Education
1:45 – 2:00	CASDEM Business

Please RSVP to the calendar invite, and please indicate whether you plan to participate in person or via conference call

Conference Call #: 720-386-9023 **Toll Free:** 1 800-356-8278 **Access Code:** 981771

Energy Savings for Schools

CASDEM

Nov 2018



Colorado Energy Office

Overview

Our Mission

To deliver cost-effective energy services and advance innovative energy solutions for the benefit of all Coloradans.

Low Income & Residential Energy Services

Commercial & Industrial Energy Services

Transportation Fuels & Technology

Public Affairs



Energy Savings for Schools

Why this Program Exists



Statutory requirements



K-12 schools spend more money on energy than computers and textbooks combined



Average age of school buildings = 42 years



K-12 schools waste 30% of energy purchased



Previous Program Design

- No Cost Energy Audit
- Renewable Energy
 Site Assessment
- Technical Support

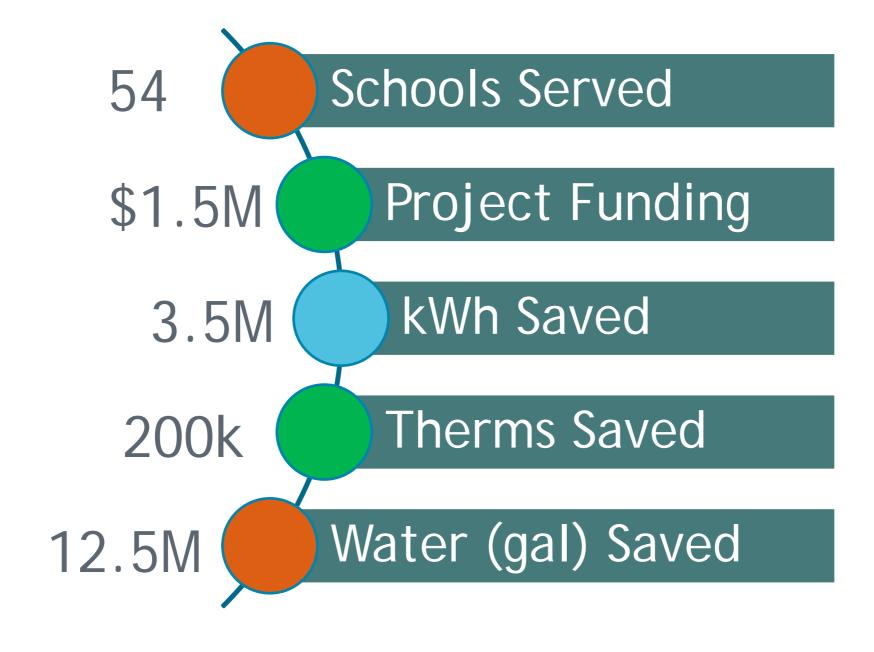
Phase I

Phase II

- Access to Funding
- Implementation Support
- Verification



Impact on Colorado



Successes and Challenges



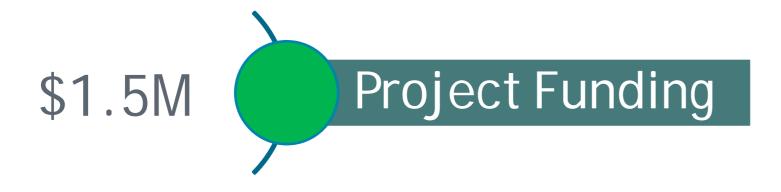
Geographic Distribution





The Problem(s)

Unequal Funding

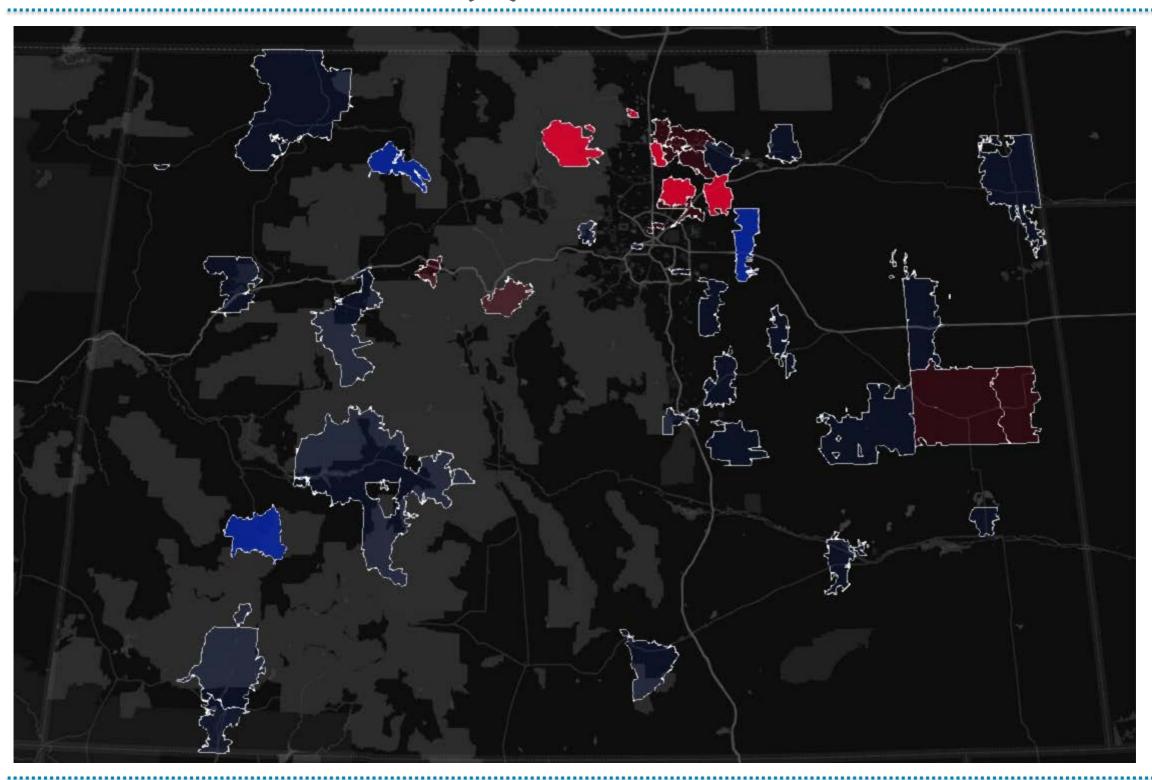


92% of \$\$\$ 10% of participants





The Problem(s)

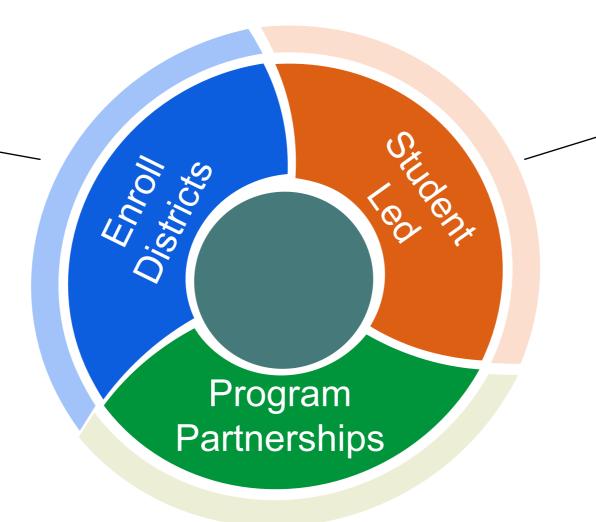




New Program Design



- Buy-In
- Culture Change



- STEM Education
- Persistence
- Engagement

- Competitions
- Direct Savings



Energy Savings for Schools

Free

Technical support and energy coaching

Free

District Energy management assessment

Free

Energy champion support network and training

Free

Student and staff engagement activity planning

Free

Support for student-led energy audit

Free Recognition for your district's efforts





How it works

Selection

Engagement

Recognition

- Applicants Apply:
 - District Information
 - Energy Consumption
 - Priorities
 - Energy engagement

- We support:
 - Educational Materials
 - Workshops and Trainings
 - Student-led Audit
 - Opportunity Register
 - Implementation support
 - Energy tracking

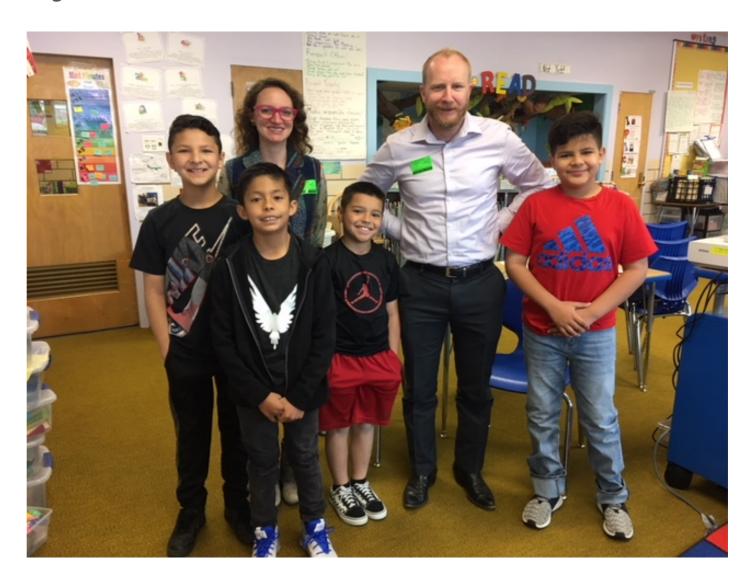
- Award ceremony
- Connection with funding sources





Participant Experience

- Learning about efficiency
- Staff and Students
- Government contacts
- Free curriculum
- Ongoing support
- Renewable Energy





Examples of Engagement

For Teachers	Lead Green Team
	Turn off lights
	Close doors
	Declutter HVAC vents
	Report temperatures
For Staff	Close doors
	Close dampers
	Schedule HVAC system
	Adjust hot water temp
For Students	Start Green Team
	Bring lessons home
	Turn off electronics
	Make energy science fair project



Partner Programs

ReNew Our Schools

- Tools to measure energy use
- Real-time data
- Competitive and fun
- Cash prizes

Energy Performance Contracting

- Get Organized
- Select ESCO
- Industrial-Grade Audit
- Construction
- M&V

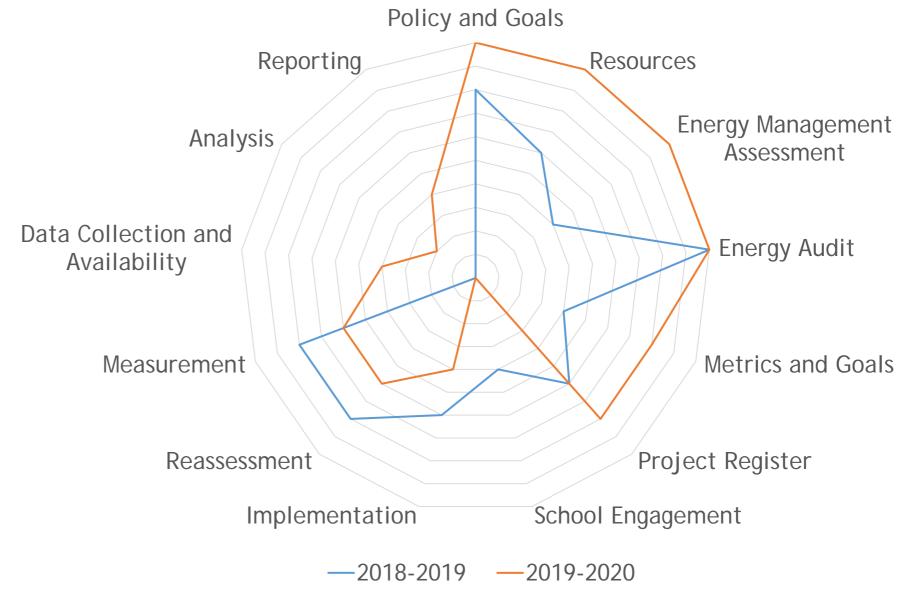


Defining Success

How many schools in the district have completed each engagement category?

Do the districts have goals? Energy Plans? Project Registers?

District Year by Year Energy Engagement





Success Story: Estes Park

Summary:

110,289 kWh projected annual savings

Total project cost: \$47k

Cost to School: \$5k

Classroom Lighting

The school has gone through training to understand how a well designed comfortable classroom facilitates learning.



Exterior Lighting

School is very happy with increased light levels and security. Neighbors have complained that it is too bright.



Gym Lighting

Light color matches daylight well making the gym feel like there are exterior windows.



Partnership: Pueblo 70

ReNew Our Schools

- Seven schools competing
- eGauges installed during EPC period
- Competition in the Spring

Energy Performance Contracting

- \$14 Million EPC Project
- \$600,000 projected annual energy savings
- Twenty-three buildings
- LED lighting, controls expansion and optimization, roof and ceiling replacements, HVAC, boilers, power sources, and retro-commissioning



Summary

- ESS offers student and staff engagement at no-cost
- Engages at the district-level
- Provides technical support for facilities staff
- Provides engagement support for staff and students
- Provides STEP Education support via KidWind and Wind for Schools



Discussion

 How can the Colorado Energy Office support school district energy managers & sustainability programs?



Questions

Anna Kelly Associate Program Manager Anna.Kelly@state.co.us 303-866-5917

Colorado Energy Office







Patti Mason Regional Director, Mountain U.S. Green Building Council pmason@usgbc.org

Glenwood Springs Elementary School

Glenwood Springs, CO US 2018-10-22 Roaring Fork School District RE-1 K-12 / 90,906 sq ft

Platte Valley School

Ovid, CO US 2018-09-26 Platte Valley School District Re-3 K-12 / 57,481 sq ft

Genoa Hugo P-12 School

Hugo, CO US 2018-09-17 Genoa-Hugo School District C-113 K-12 / 64,464 sq ft

Elbert PK-12 School

Elbert, CO US **2018-06-13** Elbert School District K-12 / 74,634 sq ft

Prairie Heights Middle School

Evans, CO US 2018-05-03 Weld County School District 6 K-12 / 103,267 sq ft

Telluride School Expansion

Telluride, CO US
2018-01-04
Telluride School District
K-12 / 29,087 sq ft

2018 LEED Certified Schools in Colorado... all certified under LEED v 2009





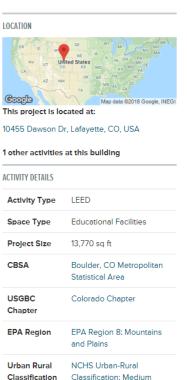
Dawson Dining Hall

LEED Dashboard 0verview

Collections (2)

Save This 💌





metro



Buena Vista New Middle and High Schools

Puena Vista, CO US

2018-09-07

Buena Vista SD K-12 / 100,000 sq ft

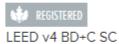


MVSD PK-12

Saguache, CO US

2018-07-05

Mountain Valley School District K-12 / 67,722 sq ft

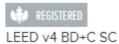


Del Norte K-12 School

ODel Norte, CO US

2018-06-18

Del Norte Consolidated School District K-12 / 120,000 sq ft



EVOLUTION OF LEED

LEED v4 NOV. 2013

Outcome oriented

LEED 2009 2009 - PRESENT

Analytically weighted

LEED v1.0-2.2

Strategy based

MARKET SECTOR ADAPTATIONS



Data Centers



Warehouses and Distribution Centers



Hospitality



Existing Buildings for Schools



Existing Buildings for Retail



Homes Multifamily Midrise

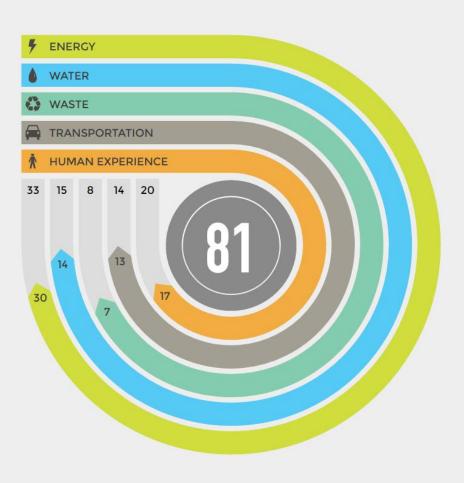


Schools









GREEN PERFORMANCE

MANAGE ongoing performance

IDENTIFY
low and high performers

COMPARE with local and global peers

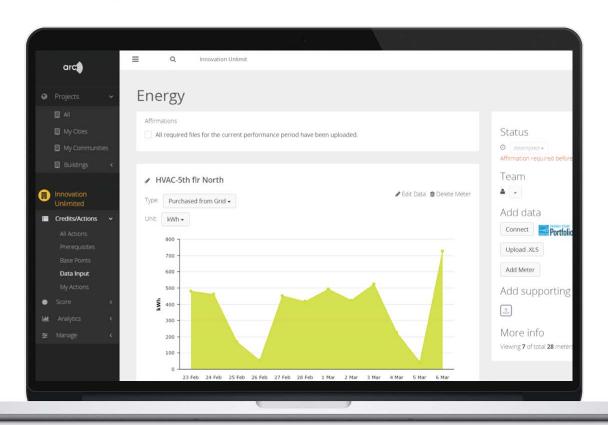
COMMUNICATE performance in a simple way



Arc calculates a performance score out of 100, based on global building data and action-oriented strategies across five categories.



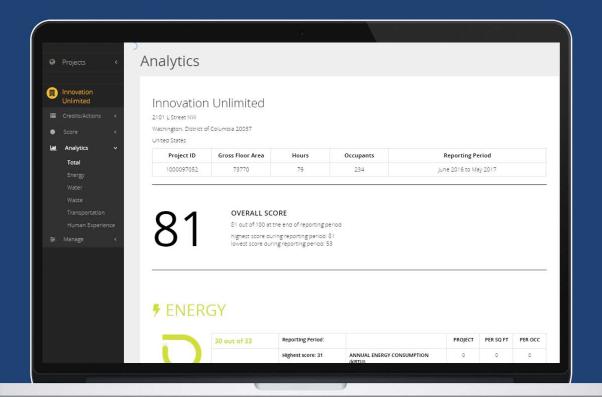
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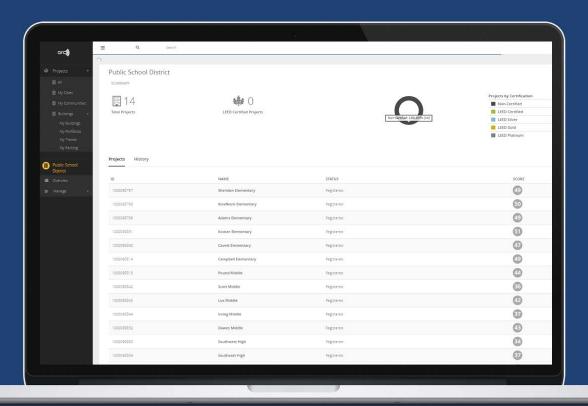
VISUALIZE SCORE:



ANALYTICS



Manage performance across a global portfolio





Performance score to LEED certification

Deeper Dive into Data



- L. Carbon emissions from measured energy use
- 2. Measured water use
- 3. Weight of waste generated and diverted
- 4. Carbon emissions from transportation choices
- 5. Environmental quality i. Occupant satisfaction ii.Interior carbon dioxide levels iii.Interior volatile organic compound levels

ENERGY

- Provide 12 months of whole building energy use
- · Visualize a score
- Compare against historical scores, local and global averages
- Lower energy use related carbon emissions in a higher score
- · Review score analytics
- · Aggregate utility bills for GBCI's review
- Score is based on an emissions per capita and unit area

ENERGY SCORE: 0-33



WATER

- Provide 12 months of whole building water use
- Visualize a score
- Compare against historical scores, local and global averages
- · Lower water use results in a higher score
- Review score analytics
- Aggregate utility bills for GBCl's review
- Score is based on a consumption per capita and per unit area

WATER SCORE: 0-15



WASTE

- Provide at least one waste analysis that includes:
 - Weight of waste generated
 - Weight of waste diverted from landfills
- · Visualize a score
- Compare against historical scores, local and global averages
- Lower waste generation and higher waste diversion rate results in a higher score
- Review score analytics
- Aggregate reports for GBCI's review
- Score is based on weight generated and diverted per capita

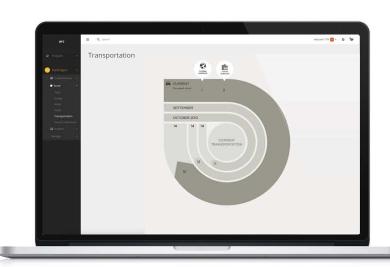
WASTE SCORE: 0-8



TRANSPORTATION

- Administer a survey and receive a minimum response rate based off the building's occupancy
- · Survey link is provided in the platform
 - · Email the survey to occupants or make available in a common area on an internet enabled device
- · Visualize a score
- Compare against historical scores, local and global averages
- · Review score analytics
- Distance traveled is converted into carbon emissions via mode of transportation. The lower the emissions the better the score.

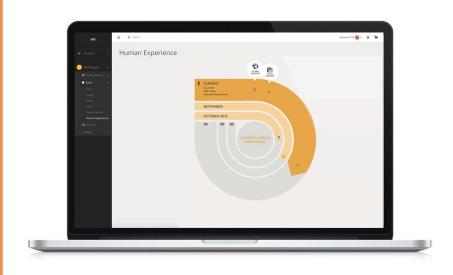
TRANSPORTATION SCORE: 0-14



HUMAN EXPERIENCE

- Administer a survey and receive a minimum response rate based off the building's occupancy
- · Survey link is provided in the platform
 - Email the survey to occupants or make available in a common area on an internet enabled device
- Conduct at least one air quality sampling for CO2 & TVOC concentrations at every 25,000 sf
- · Visualize the score
- Compare against historical scores, local and global averages
- · Review score analytics
- Higher occupant satisfaction and better indoor air quality results in higher score

HUMAN EXPERIENCE SCORE: 0-20



What are k-12 districts looking for in a tool?



One platform & one place to track whole school sustainability.

A seamless process to certify to LEED O+M and other rating systems.

Access to a **database of sustainability policies and practices** to support continuous improvement.



Simple user interface that teachers and students can interact with in the classroom.



A numerical score and visual demonstration of "greenness" that can be shared with district decision makers.

Whitefish High School

Whitefish, MT

LEARNING LAB + GREEN PAPPLE DAY OF SERVICE











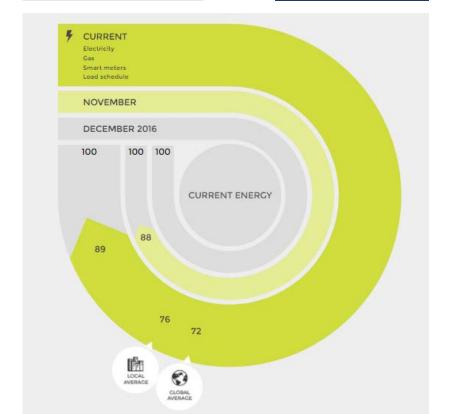
Whitefish School District, Montana



Boston Latin School Boston, MA







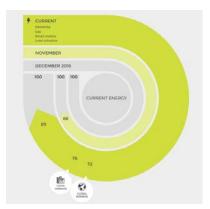
Boston Green Academy Boston, MA

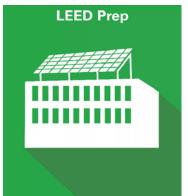
















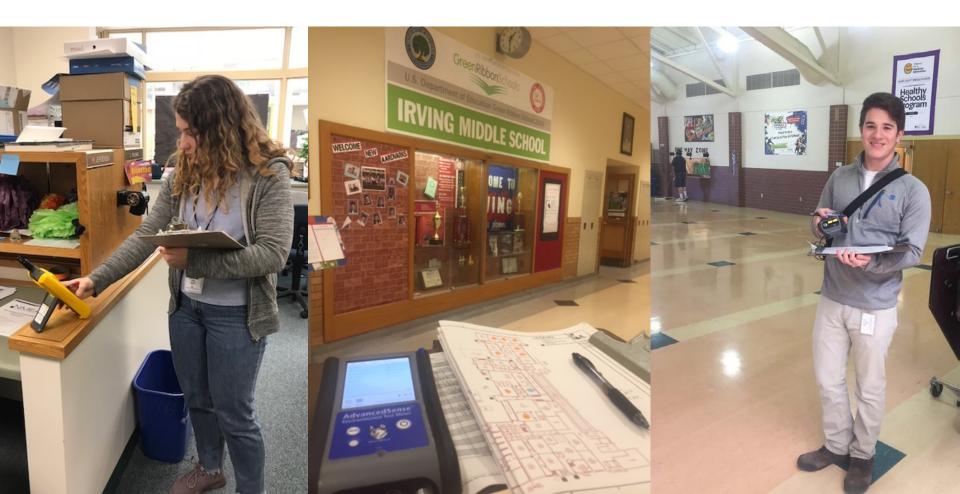


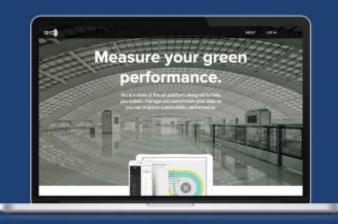
Kamehameha Schools, Hawaii





Lincoln Public Schools, Nebraska





LET'S GET STARTED!

arcskoru.com

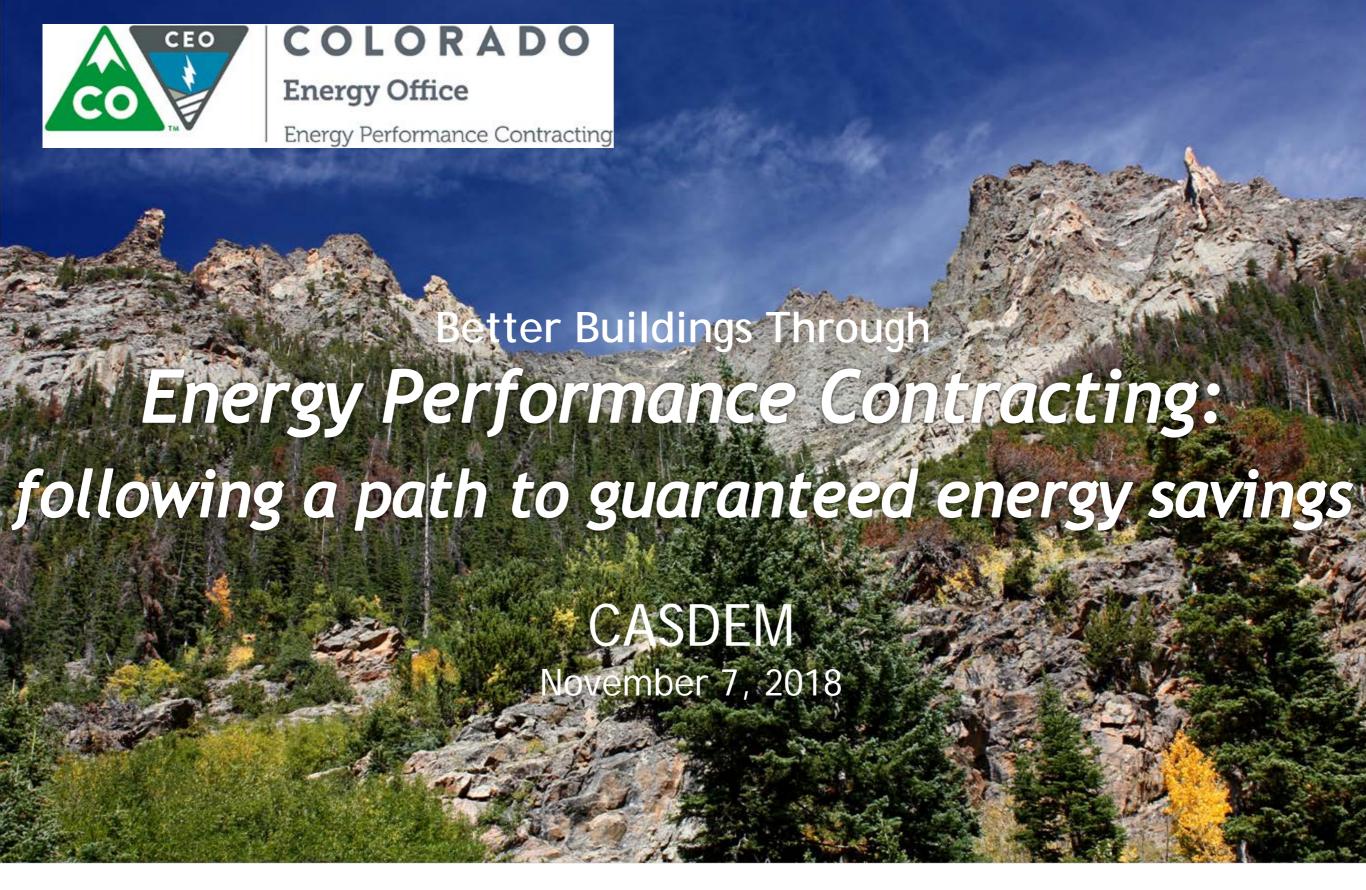
Now offering... a FREE YEAR of access to ARC for all k-12 schools!

Sign up: schools@usgbc.org

RESOURCES

- arcskoru.com
- contact@arcskoru.com
- LEED v4 O+M: usgbc.org/buildingperformance
- Arc tutorials: youtube.com/usgbc
- Pricing: usgbc.org/cert-guide/fees#om







Colorado Energy Office

Overview

Our Mission

To deliver cost-effective energy services and advance innovative energy solutions for the benefit of all Coloradans.

Low Income & Residential Energy Services

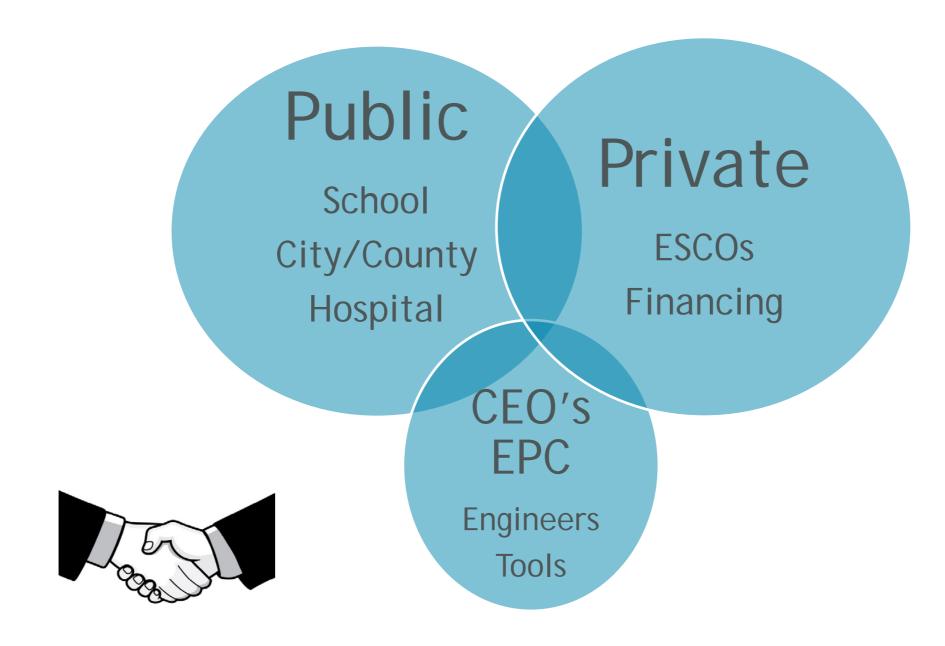
Commercial & Industrial Energy Services

Energy Performance Contracting

Transportation Fuels & Technology

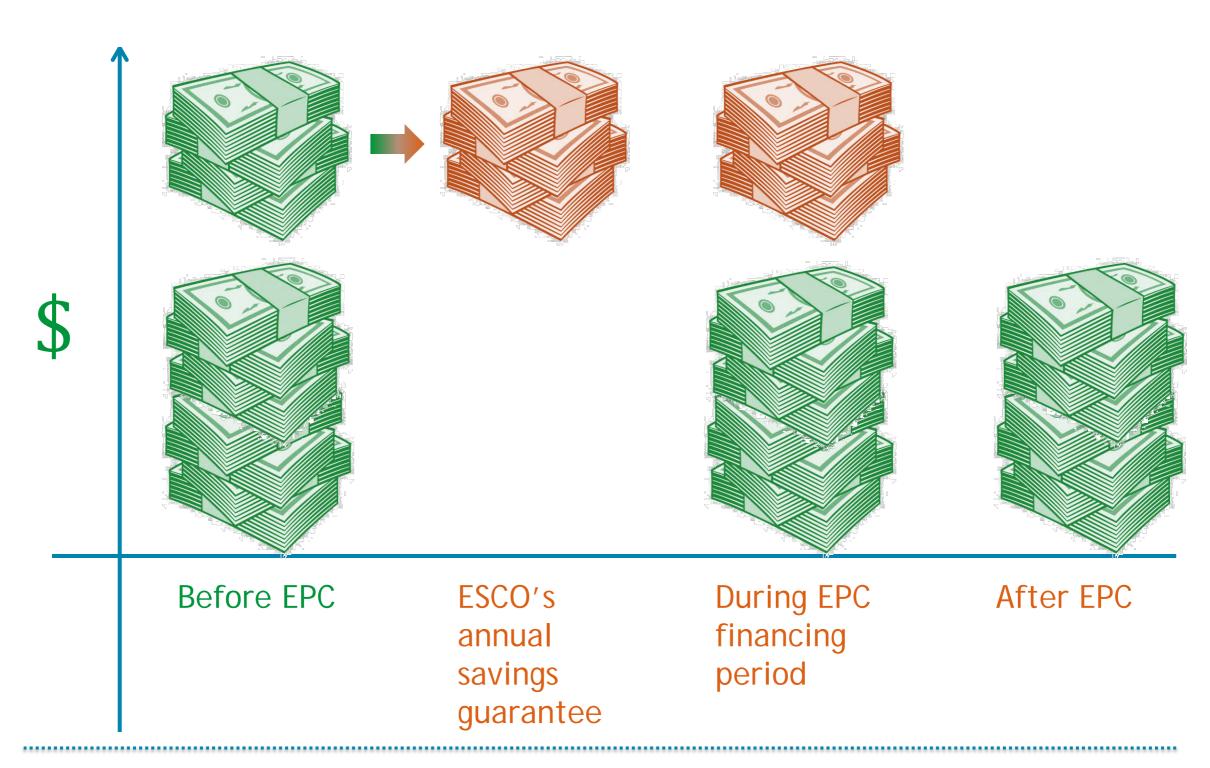
Public Affairs

Partnership





Energy performance contracting (EPC)





The 5-step EPC process

MEASUREMENT & VERIFICATION

- ENERGY PERFORMANCE CONTRACT
- FINANCING CONTRACT
- CONSTRUCTION

INVESTMENT GRADE AUDIT + PROJECT PROPOSAL CONTRACT

SELECTION OF A PRE-QUALIFIED ESCO

CLIENT COMMITMENT: (1) Build your team, (2) Sign MOU with CEO



The key elements of success with EPC

- Standardized, state-approved documents
 - Developed by consensus, and approved by State Architect +AG + Controller
 - Toolkits, contracts, guidance, protocols on website
- Pre-qualified ESCOs
 - Engineering capacity and organizational strength
 - ESCOs contracted with the State
- CEO advice and technical support
 - MOU outlining CEO support
 - Dedicated engineer throughout life cycle of project
- Private market-based financing
 - Active EPC finance community in CO



The results, through FY18

PUBLIC SECTOR EPC PROGRAM RESULTS as of June 30, 2018

Facility investments

\$574,452,035

Executed projects 206

Public clients 152
State agencies 8/18
Higher education 19/26
Counties 23/64
School districts 57/179
Municipalities 36/271
Special districts 9/?

Public buildings 2576

Square feet improved

83.1 million sf

Office space, schools, housing, libraries, jails, hospitals, street lighting, water & wastewater facilities, swimming pools, ball fields

GUARANTEED ANNUAL UTILITY SAVINGS

Electricity (kWh) 193 million

Natural gas, propane,

heating oil & coal

(therms) 10.3 million

Water (kgal) 507,560

Utility

cost savings \$34.2 million

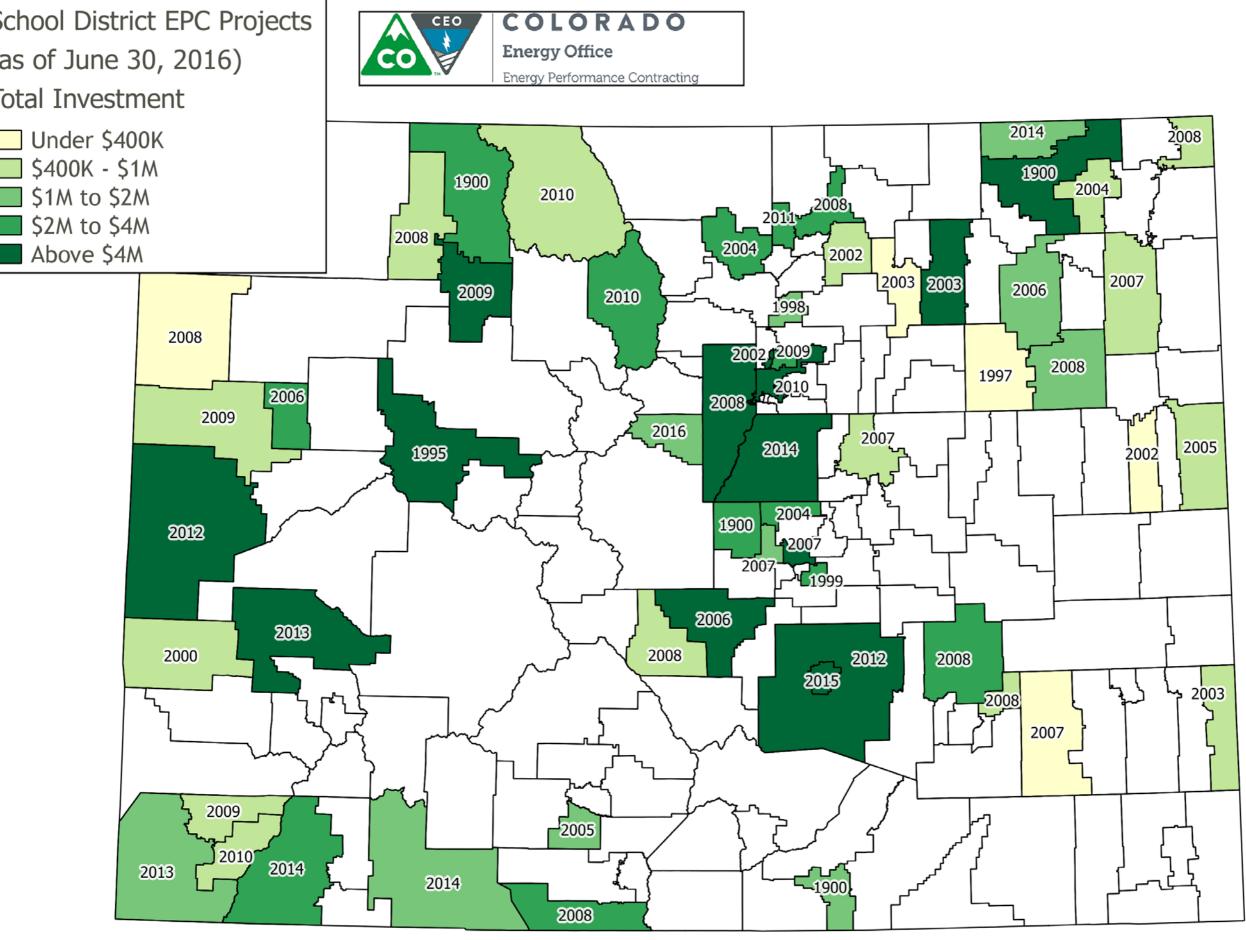
Operations & maintenance (O&M) cost savings

\$3 million

ENERGY + WATER CONSERVATION MEASURES

HVAC improvements
Boiler replacements
Pumps, fans & drivers
Equipment controls
Lighting fixtures & controls
Occupancy sensors
Operations & scheduling
Building envelope improvements
Water efficiency (low flow fixtures, irrigation, evapotranspiration & cooling tower controls, ice machine & laundry conversions, pool covers, valve replacements)
Street & traffic lights
Renewable energy installations





Source: Colorado Energy Office

CEO's Experience with EPC in Colorado School Districts

- 35% of all EPC projects have been in School Districts
- Improvements: \$275,000 to \$10.5 million
- Project size: from 1 building to 58 school facilities
- Annual utility cost savings guarantees: \$11K to \$570K
- The average financing period: 11 years
- A number of school districts have leveraged a first EPC project for subsequent phases.
- Leveraging other grants in an EPC: DOLA, BEST
- 12 current SD projects: 5 implementing; 7 in M&V





The ESCO's Role in Energy Performance Contracting

Presented by the Energy Services Coalition (ESC)

Carl Hurst, P.E.
Director
Iconergy, Ltd



Mission

E(S)C

To promote the benefits of, provide education on, and serve as an advocate for the widespread use of energy performance contracting in public and private facilities.

The diverse membership of the ESC provides a unique opportunity to:

- Provide independent third party information and education
- Identify and overcome barriers in Colorado



Energy Performance Contracting At A Glance

Projects pay for themselves!



Savings stack up over time...

A way to upgrade your facilities without dipping into your capital budget

Use future energy savings to pay for projects



Your ESCO Partner

A qualified ESCO combines multiple disciplines into a turnkey approach for your Energy Performance Contract including:

- Identification/evaluation of project opportunities
- Financing and other funding sources (grants/rebates, etc)
- Installation, project commissioning, and construction management
- Measurement and verification of energy savings
- Staff and building operator training
- A savings guarantee that covers the cost of the total project

What Challenges Do You Face At Your Facilities? We've Got The Solution!

Challenges

Sustainability Policies

Conservation
 Concerns

E(S)C

- Aging Infrastructure
- Rising Operations Costs
- Lack of Capital
- Code and Regulation
- Comfort Issues
- Deferred Maintenance
- Inadequate In-House Staffing/Training

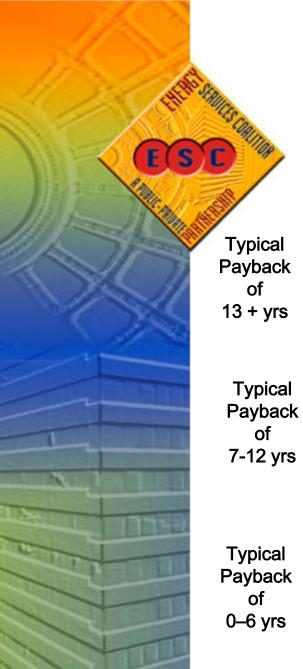
The Solution



Energy
Performanc
e
Contracting

Results

- Reduced Energy & Operational Costs
- Modernized Facilities
- Reduced Waste
- Single Source Responsibility
- Guaranteed Results
- Project Risk Mitigation
- Environmental Compliance
- Sustainability Initiatives
- Reduced Emissions



A Typical Project Includes Bundling these Measures

Larger Capital Improvements, Lower Savings or Return Items

- Major mechanical replacements (ERV, AHUs, boilers)
- Capital improvement item priority list
- Central plant and/or heating & cooling system replacements
- Renewable technology

Medium Capital Cost, Medium Return/Payback Items

- Wastewater and water process optimization & reductions
- · Safety & environmental controls
- · Water conservation & irrigation

l k

Lower Capital Cost, High Return/Short payback Items

- Interior and exterior lighting, controls, HVAC
- VAV/VFD retrofits
- · On-site Energy Manager, retro-commissioning

Combined Projects

> Typical EPC Program Term -10 to 20 yrs.



Typical Energy Performance Contract Scope

- LED interior and exterior lighting systems
- Building automation system upgrades
- HVAC system improvements
- Boiler replacements
- Plant improvements
- Renewable energy systems
- Landscape irrigation
- Plumbing fixture replacements
- Commissioning
- Utility rate adjustments
- Building envelope windows, roofs, doors



An Alternative Approach for Building Improvements

Traditional Design-Bid-Build

- Longer design and development process
- Cost not known until design is complete
- Lowest bid drives subcontractor selection
- Many contracts and lack of accountability
- Design misses cause change orders
- Customer at risk for costs and savings

Energy Performance Contracting (EPC)

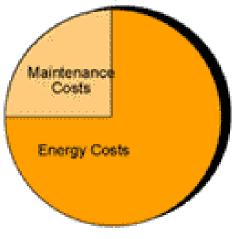
- Collaborative design reduces development time
- Project price defined at TEA/IGA completion
- Collaboration with subcontractors develops best cost solutions
- Single point of responsibility resides with ESCo
- No change orders fixed project price
- ESCo at risk for costs and savings



How It Works

Annual Budget

Before Improvements

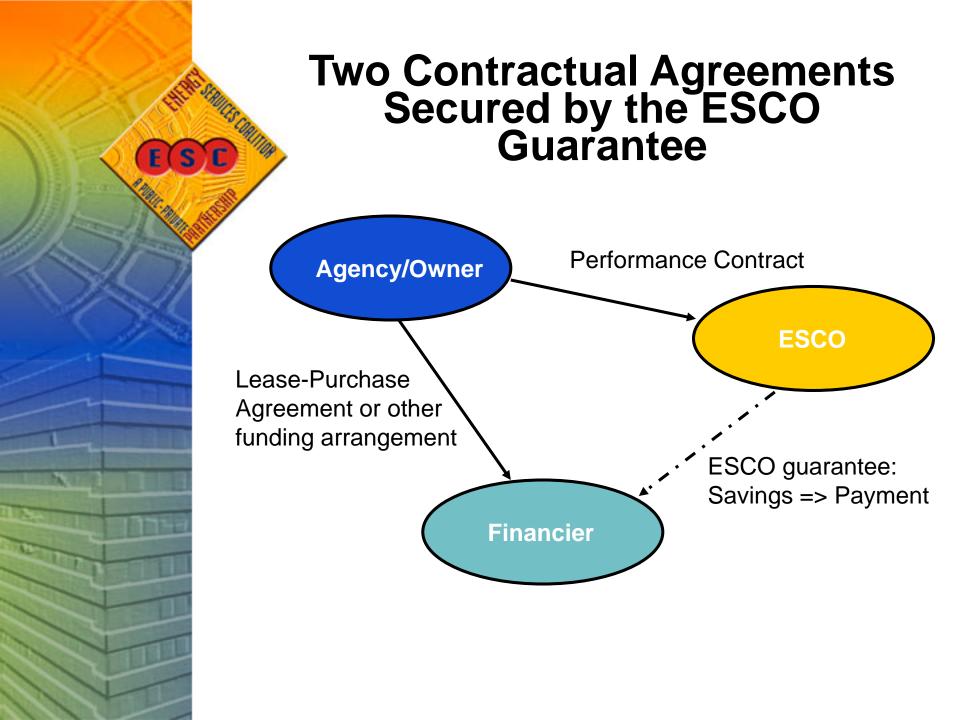


Money otherwise owed to the gas or electric utility pays for equipment!

Annual Budget

After Improvements



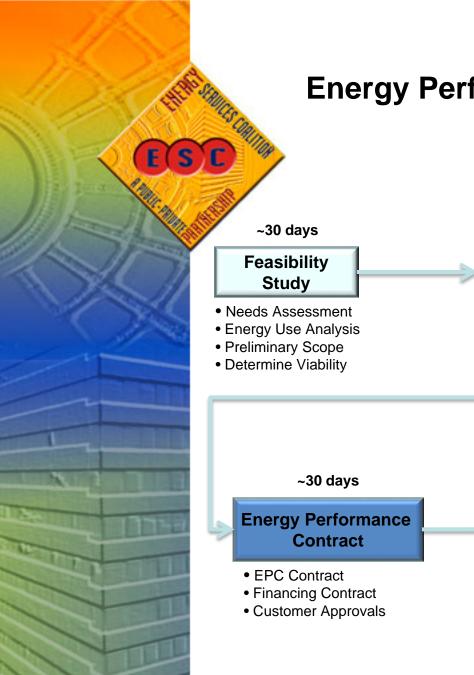




- Lease-purchase finance agreement where savings meet annual payments
- Other financing sources (bonds, COPs)
- Internal "borrowing"

E(S)C

- Supplemental funds for cash infusion to expand the project funding and scope (utility rebates, grants, in-house funds, etc.)
- Blend lease-purchase financing with supplemental funds
- ESCO facilitates financing but does not profit from financing



Energy Performance Contract Process

ESCo Selection

~15-90 days

- Sign MOU with Colorado Energy Office
- Select ESCo via
 Sole Source or RFP

~30 -90 days

Investment Grade Audit

- IGA Contract
- Scope Selection
- Price and Savings
- Project Development

6months - 1 year

Implementation

- Final Design
- Award Subcontracts
- Order Equipment
- Implement Project
- Commission

3 Years +

Verification

- Acceptance
- Measurement and Verification
- Ongoing Support



Discussion

Questions
Trends
Opportunities
Best Practices

Mirka DellaCava

EPC Senior Program Manager
Colorado Energy Office
303.866.3464
mirka.dellacava@state.co.us

Colorado Department of Education Building Excellent Schools Today



Building Excellent Schools Today – BEST

- Nine-member appointed advisory board
- Available to all public school districts, charter schools, institute charter schools, boards of cooperative educational services and the Colorado School for the Deaf and Blind
- Per statute, priorities are:
 - 1) Health, Safety, Security and Technology
 - 2) Overcrowding
 - 3) All other projects
- All applicants are required to provide matching money.



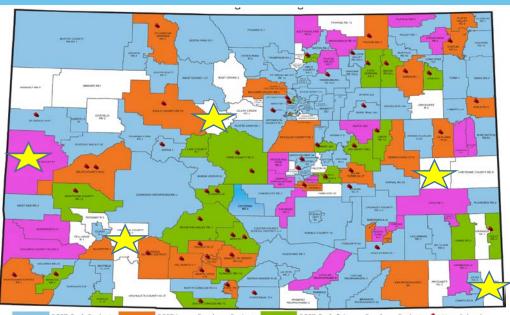
Match Requirements

- The board shall seek to be as equitable as practicable by considering the total financial capacity of each applicant.
- A school district shall not be required to provide any amount of matching moneys in excess of the difference between the school district's limit of bonded indebtedness and the total amount of outstanding bonded indebtedness already incurred by the school district
 - The board may grant a waiver or reduction if:
 - The waiver or reduction would significantly enhance educational opportunity and quality;
 - The cost of complying with the matching moneys requirement would significantly limit educational opportunities; or
 - Extenuating circumstances deemed significant by the board make a waiver appropriate.



Bragging

BEST has awarded 319 grants in 135 school districts.







Bragging



BEST has generated nearly \$1.7 billion in capital projects and helped create nearly 30,000 jobs.





Bragging

BEST has improved health, safety and security in 409 schools and for nearly 180,000 students.



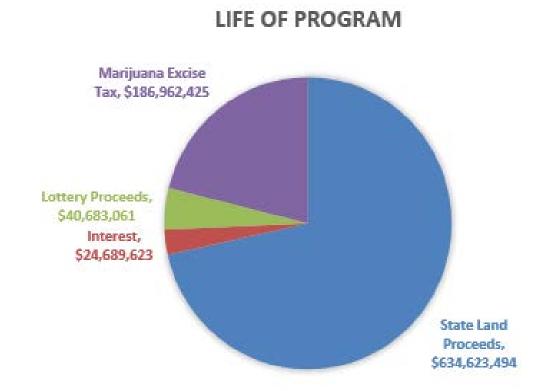




Capital Construction Assistance Fund Revenue Sources

\$886 Million in Total Revenue

- 71.5% State Land Proceeds
- 21% Marijuana Excise Tax
- 4.5% Colorado Lottery
- 3% Interest



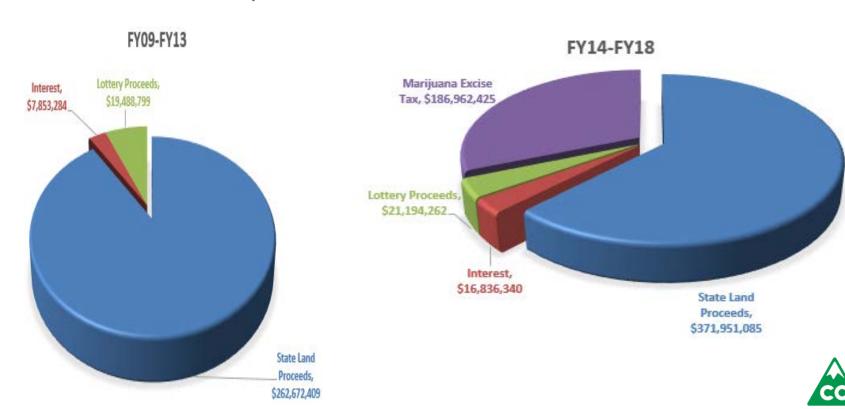
*These revenues, plus matching grants, plus financing through Certificates of Participation has generated \$1.7 billion in projects.

*Soon to be over \$2 billion. Tentatively +\$447M in FY19.

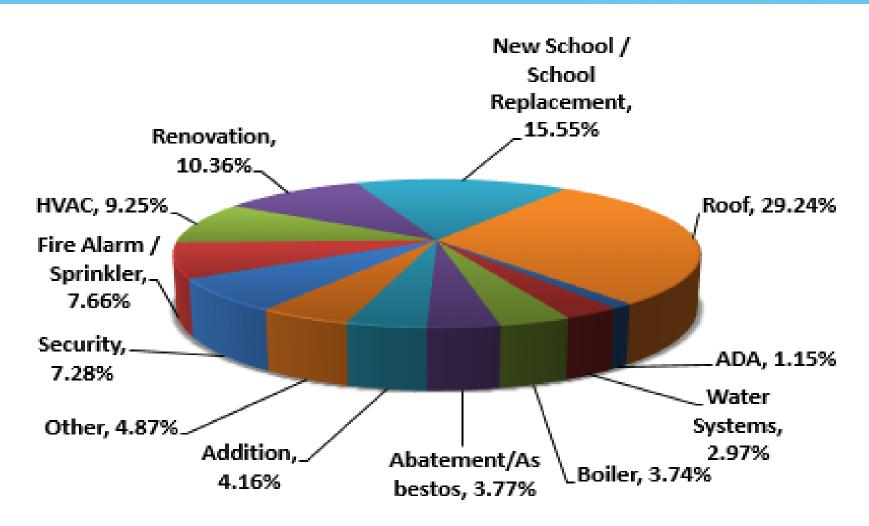


Capital Construction Assistance Fund Revenue Sources

- Revenue from the Land Board peaked at \$92M in FY15. \$63M average
- Since FY14 Marijuana Excise Tax has accounted for 31% of revenues
- HB18-1070 increased amount of excise tax credited to the Assistance Fund from \$40M cap to 90% of all tax collected. \$54M in FY18



Types of Projects





Office of Capital Construction Funded Programs

Charter School Capital Construction Program funds are distributed to qualified charter schools based on pupil count. 12.5% of marijuana excise tax deposited into the Assistance Fund annually plus \$20 million annually from the State Education Fund

Emergency Grants are available for unanticipated events that threaten health or safety or render all or a significant portion of a public school facility unusable for educational purposes

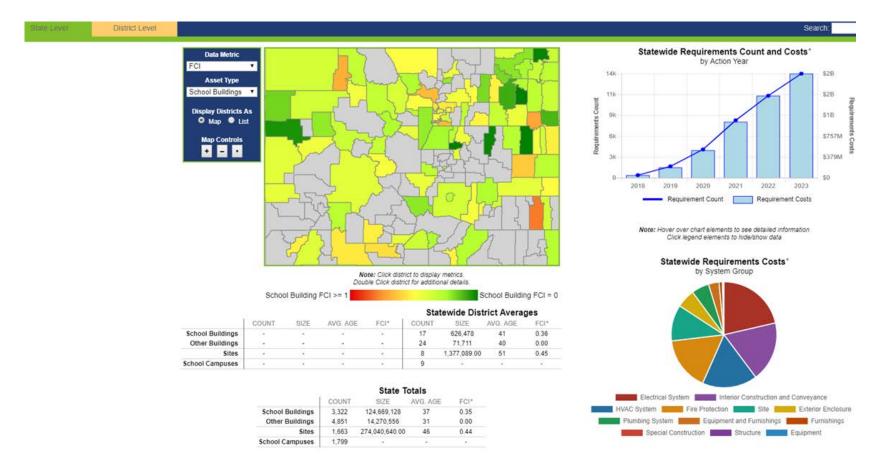
Building Excellent Schools Today Grants

- Cash funds are typically used to fund smaller projects, such as roofs, boiler replacements and fire alarms
- Lease-Purchase funds are typically used to fund larger projects, such as new schools, major renovations and additions. These grants are financed through Certificates of Participation and repaid with Assistance Fund revenues.



Facility Insight Assessments

https://api.vfafacility.com/CDOEDashboard/stateLevel/state.jsp





Current Year



FY18-19 Grant Round Requested

- 52 applications from 44 unique districts or charter schools
- \$882M total project cost
- \$529M in State funds
- Last year 50 applications for \$630M in total project cost

- 21 projects over \$10M
- 19 projects under \$1M



Current Year



FY18-19 Grant Round

Cash Grants:

\$84,947,023 (BEST)

+ \$74,084,064 (match)

= \$159,031,087

Lease/Purchase Grants:

\$190,039,093 (BEST)

+ \$98,227,980 (match)

= \$288,267,073

- Total projects = \$447,298,160!
 - \$134M dependent on Bond Elections
 - \$68M in projects backup projects
 - 6 project bonds on Nov ballot



The Future?



- Cash grants only?
 - \$85M cash per year from BEST
 - \$20 40M from districts
 - \$100 \$120M in projects
- Future of COPs
 - Average \$120M in revenues
 - \$85M in cash grants
 - \$50M debt service on prior COPs capped by statute
 - \$5M cap increase = approximately
 \$115M in new projects.

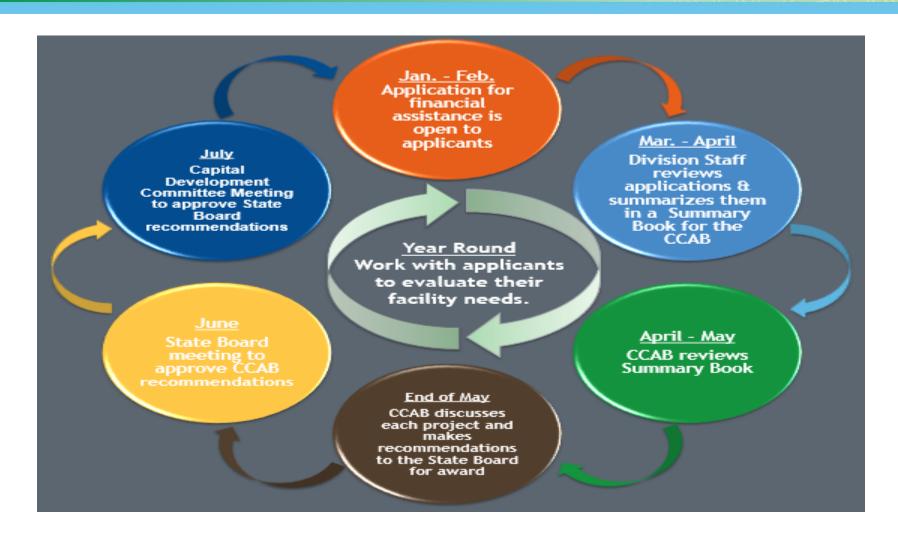


Facility Insight Assessments

- In 2009, over 8,000 facilities assessed revealing \$13.9 billion in capital construction needs
- Began revisions in 2016. Complete 2021, and reassess every five years
- 258 schools assessed/~19 million sq. ft. (16% of total schools sq. ft. in Colorado),
 - Shows approximately 46% increase in needs
 - So far \$2.3 Billion in capital needs has been identified
- This does not account for schools maintained, rehabilitated or reconstructed outside of the BEST grant
- Grant applicants are prioritized for assessment
- CDE assessments are not Master Plans!
- CDE assessments are not code inspections!

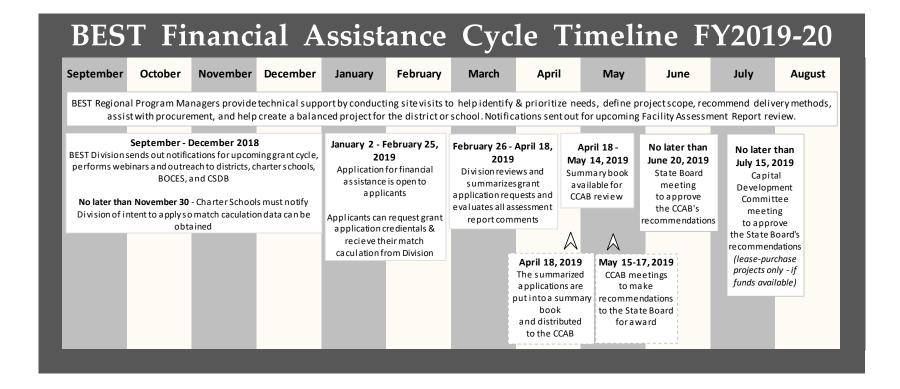


BEST Grant Cycle Timeline





BEST Grant Cycle Timeline





Building Excellent Schools Today – BEST





#BESTschoolsCO

CO Dept of Education @codepted · 56m



CO Dept of Education @codepted · 5h

#DYK since it was created the BEST program has received nearly \$40M from @ColoLottery? That's nearly \$4M per year toward improving the learning environment in CO's public schools. cde.state.co.us/cdefinance/cap... ... #edcolo #BESTschoolsCO

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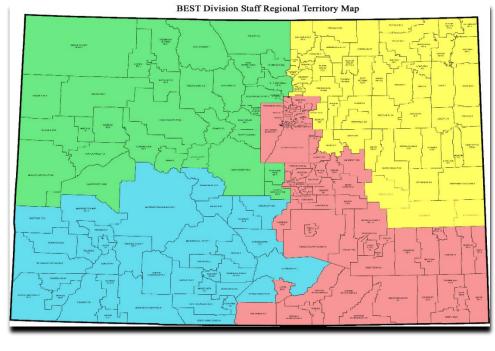
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