



Energy Efficiency Workshop: EPA's Clean Power Plan

October 23, 2015



COLORADO
Energy Office

Goals for Today's Workshop

- Work toward a **common understanding** of:
 - What we mean by energy efficiency (EE)
 - EE programs that exist in Colorado today
 - How electricity savings could fit into a CPP compliance strategy
 - Opportunities and challenges when incorporating EE into a CPP compliance strategy
- Help provide **feedback** to the Colorado Energy Office on EE in the CPP
- Help stakeholders begin to frame their **formal feedback** on EE in the CPP to the CDPHE

Agenda

- 9:00-9:30 a.m. - Registration
- 9:30-9:45 a.m. - Welcoming Remarks
- 9:45-10:30 a.m. - EPA's Clean Power Plan Overview and Timeline
- 10:30-12:30 p.m. - Colorado's Current Energy Efficiency Programs
 - 10:30-11:00 a.m. - Investor-owned Utility Programs
 - 11:00-11:30 a.m. - Municipal and Cooperative Utility Programs
- 11:30-11:45 a.m. - *Break*
 - 11:45-12:00 a.m. - Colorado Energy Office Programs
 - 12:00 -12:15 p.m. - Local Government & Non-profit Programs
 - 12:15-12:30 p.m. - Private Sector & Other Opportunities
- 12:30-1:15 p.m. - *Lunch Break*
- 1:15-3:00 p.m. - How can energy efficiency fit into a compliance plan?
- 3:00-3:15 p.m. - Wrap up and next steps

Feedback & Information

- Feedback to CEO
 - Blank cards at your tables are for questions that could not be addressed due to time and/or comments for consideration (CEO staff will collect)
 - ColoradoEnergyOffice@state.co.us
Please use the subject line: “EE in CPP”
 - Questions and comments will be aggregated in a shared document to be posted online
- CDPHE website: www.colorado.gov/cdphe/CleanPowerPlan
 - o Sign up for email notifications
 - o Formal public comments: cdphe.commentsapcd@state.co.us
 - o Find information on Colorado’s public meetings, shared documents, and more
- EPA website: www2.epa.gov/cleanpowerplan
 - o Find federal rules, technical support documents, tools and more

EPA's Clean Power Plan: Overview and Timeline

Chris Colclasure

Air Pollution Control Division

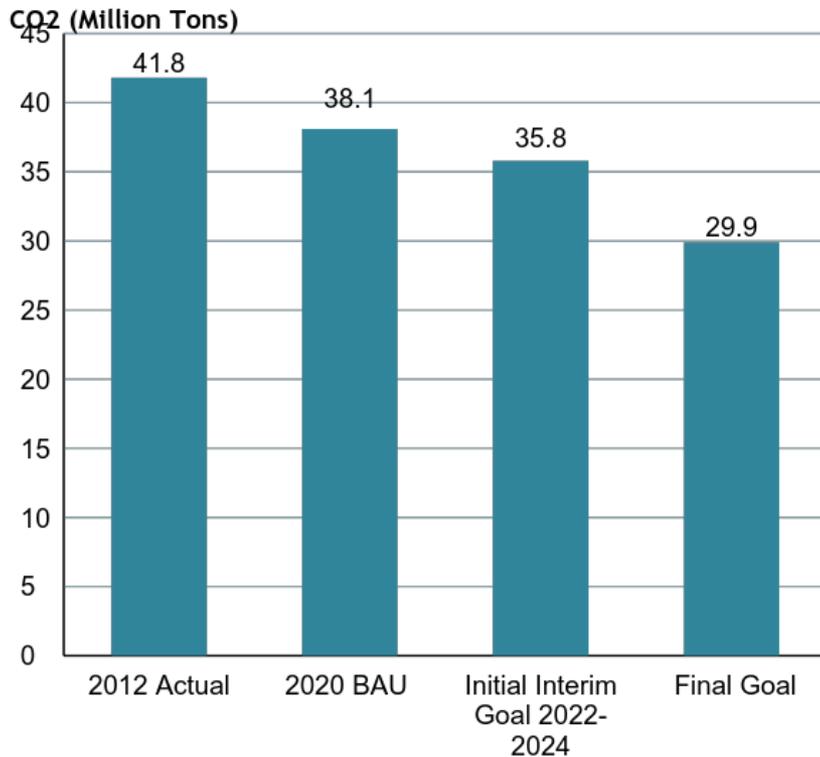
Colorado Department of Public Health & Environment

What CO Must Do

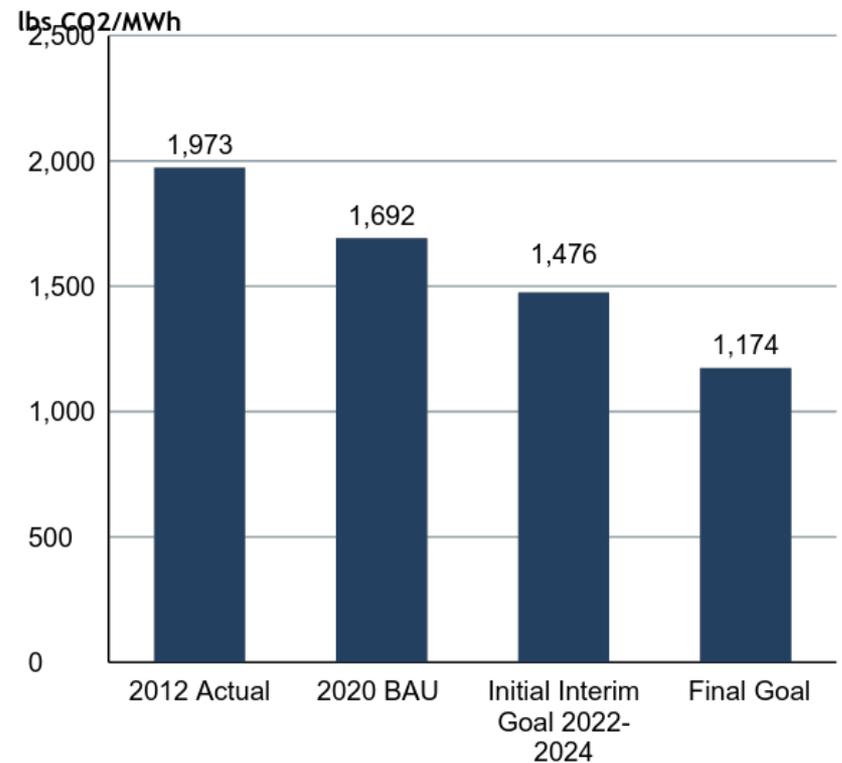
- Reduce CO₂ emissions from EGUs by 2030 (from 2012 baseline)
 - by 38% on a rate basis, or
 - by 31% on a mass basis
- Meet **interim “step” goals** (2-3 year periods between 2022-2029)
- Adopt an **approvable** state plan or be subject to federal plan
- Provide **initial submittal** by 9/6/2016 and final plan by 9/6/2018

Colorado's CPP Goal

Mass



Rate



CDPHE's Vision for Public Process

Stakeholder Meetings

INITIAL

- Sept 2015
- Feb 2016
- May 2016

FINAL PLAN:

- Details pending

Community Engagement

Nov 2015: Durango
Dec 2015: Commerce City
Mar 2016: Craig
Apr 2016: Pueblo

Public Processes

- AQCC Briefing: July 2016
- AQCC Rulemaking: July 2017 - Dec 2017

Compliance Plan Types

- **Emissions Standard**
 - Federally enforceable emission standard placed on the affected EGU
 - Can be designed as:
 - Mass-based (lbs. of CO₂ emitted)
 - Rate-based (MWh/ton of CO₂ emitted)
- **State Measures Plan**
 - State includes non-federally enforceable components designed to achieve a state mass-based goal. This requires a federally enforceable backstop.

Building Blocks:

- BB1 - Heat Rate Improvement
- BB2 - Redispatch
- BB3 - Zero-emitting Resources
- ~~BB4 - Energy Efficiency~~
 - Removed in final rule, but EE still can be used toward compliance.

Energy Efficiency in the CPP

Mass

lbs. CO₂

- Reduces emissions by reducing load
- Allowances:
 - allocate (can have an EE set aside)
 - auction (can generate \$ for EE)
- Receive EPA matching allowances through CEIP

Rate

$\frac{\text{lbs. CO}_2}{\text{MWh}}$

- ERCs value added to EGUs denominator to lower emissions rate
- ERCs can be tradable
- Receive matching ERCs through CEIP

Compliance Criteria for EE

- **Quantifiable:** Savings are reliably measured in a manner that can be replicated.
- **Non-duplicative:** Savings are used for compliance once, and cannot be used in another state plan.
- **Permanent:** Savings must be demonstrated for each compliance period unless no longer necessary for the State to meet its State level of performance.
- **Verifiable:** Recordkeeping and reporting requirements are in place to enable the State to independently evaluate, measure, and verify compliance.
- **Enforceable:**
 - Elements are technically accurate with a specified timeline
 - Clearly defined compliance requirements
 - Responsibility and liabilities identified
 - Each compliance activity is enforceable as a practical matter
 - The ability remains in place to enforce against violations

Key Decisions

- Emissions Standard vs. State Measures
- Mass vs. Rate
 - Allocation methodology
 - Emission Reduction Credit issuance
 - Set aside
- Allowing trading (interstate / intrastate)
- Single state vs. multi-state plan
- Treatment of new sources
- Clean Energy Incentive Program





Questions?



Examples of Colorado's EE Programs

- **Investor-owned Utility DSM programs**
 - Xcel Energy
 - Black Hills Energy
- **Municipal & Cooperative Utility Programs**
 - Tri-State Generation & Transmission
 - Holy Cross Energy
 - Platte River Power Authority
 - Colorado Springs Utilities
- **Colorado Energy Office Programs**
- **Local Government & Non-profit Programs**
 - City of Denver
 - Garfield Clean Energy / Clean Energy Economy for the Region
- **Private Sector & Other EE Opportunities**
 - Energy Efficiency Business Coalition
 - Cadmus Group
 - Southwest Energy Efficiency Project

Questions

1. Broadly describe the energy efficiency program(s) including:
 - What is the overall scope of the program?
 - How long have these programs been offered?
 - In what service territory or counties are they offered?
 - What are the annualized electricity savings from the programs?
2. How are electricity savings from the program measured, reported, and verified?
3. Do the savings attributed to these programs overlap with other energy efficiency programs? If so, how do you ensure they are not double counted?
4. Broadly outline the lifespan of the energy efficiency measures included in the program. For how many years are those savings guaranteed?
5. Are these programs required by any law, regulation, or local jurisdiction? If so, by what means are the required savings enforced?

Investor-owned Utility Programs

- Xcel Energy
 - Bill Conrad
- Black Hills Energy
 - Tana Simard-Pacheco
 - Heidi Morgan



ENERGY EFFICIENCY
WORKSHOP

NREL 10-23-15

- Any business or residence on a PSCo tariff that contributes to the DSM cost rider is eligible
- Programs for most common energy end uses or holistic approach to certain customer types
- Some programs before 2009, most have ramped up since 2007 passage of HB 1037
- Required by statute under jurisdiction of CO PUC
- Savings goal is not enforced by PUC,
 - no economic incentive may be collected if goal is not met

CUSTOMER DSM SAVINGS ACHIEVEMENTS



Since 2009

- Total electric bill savings of about \$1.3 billion
- Customers will cumulatively save more than 25 million MWh over lifetime of 2009-2014 measures
- Customers received over \$255 million in rebates for efficiency improvements at home or work
- Reduced peak demand by over 450 MW, about half of the capacity at Cherokee once completed
- Expanded DSM programs to include about 1,000 rebate measures that customers can use to save.
- Each year, more than 500,000 customers in Colorado participate in our DSM programs.

- Three steps:
 - Technical assumption development
 - Post-installation measurement and verification
 - Program impact evaluation
- Technical assumptions use internal and independent third party resources
- Third party measurement and verification by sample
- Impact evaluation calculates
- program influence (net to gross)

HOW XCEL ENERGY CALCULATES SAVINGS (CONT'D)



- All stages use widely accepted best practices
- Careful attention to interactive savings effects
 - Within technical assumptions (e.g. cooling & lighting)
 - Within evaluation (e.g. upstream lighting and behavioral)
- Lifetimes are deemed based on manufacturer specifications and customer characteristics
- Portfolio lifetime of approximately 15 years
 - 13 years for residential program
 - 16 years for business program

- CO PUC set electric energy efficiency goals in 2014: 400 GWh and 65 MW per year through 2020
- CO PUC set budget cap of ~\$84 million. Controls non-participant costs and encourages cost effectiveness
- Report participation rates by tracking “unique” participants across programs
- Gas minimum budget of \$12 million per year, well above statutory minimum
- Continue to look for innovations. We expect to file the next DSM plan in ‘16 with more new techs

EXAMPLES OF DSM EFFORTS IN 2015-2015 PLAN



- Annual Targets of 400 GWh in 2015 and 2016
- Continues many popular programs such as:
 - Lighting, commercial refrigeration, and cooling efficiency for businesses
 - Lighting, air conditioning, and refrigerator recycling for residential customers
- New options for customers to participate (new programs and pilots):
 - Home Energy Squad efficient equipment direct installation program for homes, advocated by stakeholders like SWEEP
 - LED streetlights program for Xcel Energy-owned outdoor lighting fixtures in cities across CO
 - Expanded behavioral savings for homes & businesses
 - Retrofit incentives for low-income and market-rate multifamily buildings, targeted at holistic improvements
 - Wi Fi Thermostats for residential customers
 - Bill credits for participating in peak reduction events
 - Testing cutting edge software that uses customers' existing building controls to reduce demand at system peak

- EE can still play a role in CPP, along with other cost-effective CO₂ reduction strategies
- Early action advancing EE in CO not credited but positioned for future
- Achievements in 2013 and later count in state plans, but only what is still saving in 2022.
- Lifetime matters. Prematurely pushing technologies that will become more cost effective can reduce how long we can claim savings and increase cost pressure
- Clean Energy Incentive Program for low income:
 - Definition for low income still unclear
 - Timing for programs: must start after state plan is submitted to EPA
 - Credit granted for achievements in 2020 and 2021 and can be carried forward to any year.
 - Credits allocated to states based on reduction required
 - Comments to Federal Plan may encourage EPA to change

THANK YOU





Black Hills Energy – Colorado Electric DSM Program Overview

October 23, 2015



Black Hills' Electric DSM Programs _ History

Electric DSM programs have been offered since 2009 to all customer classes in the Black Hills Energy _ Colorado Electric service territory.



Scope of Current Electric DSM Portfolio

Residential Energy Efficiency Programs

High Efficiency Lighting	Residential customers receive rebates to purchase CFLs, LEDs and high efficiency lighting fixtures.
High Efficiency Cooling	Residential customers receive rebates to purchase and install central air conditioners, ground source heat pumps and evaporative coolers.
Appliance Recycling	Residential customers receive rebates for recycling their older, inefficient refrigerators, freezers, and room air conditioners.
High Efficiency Appliances	Residential customers receive rebates to purchase qualified ENERGY STAR dish washers, refrigerators and smart power strips.
Online Audit Tool	Customers may access information on home energy use from a designated utility website.

Scope of Current Electric DSM Portfolio cont.

Commercial and Industrial Energy Efficiency Programs

Prescriptive C&I	C&I customers receive rebates for the installation, replacement or retrofit of qualifying electric savings.
Small Business Direct Lighting	Black Hills covers portion of the total project costs when small commercial customers purchase and install efficient lighting.
Custom C&I Program	C&I customers receive rebates for the installation or replacement of cost-effective, efficient measures not included in the C&I prescriptive program.
New Construction	C&I customers receive incentives for the design and construction of LEED certified new buildings.

Scope of Current Electric DSM Portfolio cont.

Special Programs

Low Income Assistance

Qualifying low-income customers receive no cost lighting, refrigerator/freezers, and evaporative coolers

School Based Energy Education

Middle school children receive energy kits, plus education and information on how they can help parents save energy

Energy and Demand Savings Achievements

Black Hills Energy – Colorado Electric has already met the 2018 electric DSM plan energy savings and peak demand reduction goal requirements of C.R.S. § 40-3.2-104 :

GOAL REDUCTION PERCENTAGES						
(Actual and Projected)						
Plan Year	Actual and Projected Peak Savings (MW)	CRS 40-3.2-104(2) Savings Requirements by 2018 (MW)	% of 2018 Peak Savings Goal	Actual and Projected Program Savings (MWh)	CRS 40-3.2-104(2) Savings Requirements by 2018 (MWh)	% of 2018 Program Savings Goal
2009/2010	1.16	18	6%	4,554	91,208	5%
2010/2011	3.92	18	22%	17,296	91,208	19%
2011/2012	4.73	18	26%	18,561	91,208	20%
2012-2013	6.75	18	38%	31,740	91,208	35%
2014	4.26	18	24%	17,830	91,208	20%
2015	7.02	18	39%	24,992	91,208	27%
2016	5.23	18	29%	18,014	91,208	20%
2017	5.60	18	31%	19,769	91,208	22%
2018	5.82	18	32%	20,633	91,208	23%
Total	44.49	18	247%	171,388	91,208	190%

Verification

- Well-developed algorithms and models determine the savings achieved during a plan year
- Report filed each year on April 1. Includes requirements set forth in C.R.S. § 40-3.2-104:
 - Program expenditures, including incentive payments;
 - Peak demand and energy savings impacts, and the techniques used to estimate those impacts;
 - Avoided costs and the techniques used to estimate those costs;
 - The estimated cost-effectiveness of the DSM programs;
 - The net economic benefits of the DSM programs; and
 - Any other information required by the commission.
- Evaluation, Measurement and Verification Reporting (EM&V)
 - Each program analyzed to determine if implementation is achieving desired goals
 - EM&V reports on evaluated programs filed annually

No Overlap

- Black Hills Energy – Colorado Electric is an electric-only utility, and only claims savings related to use of electricity
- Programs within the electric DSM Plan do not overlap and are complementary of each other
- Future resource planning incorporates expected electric DSM savings over the planning period

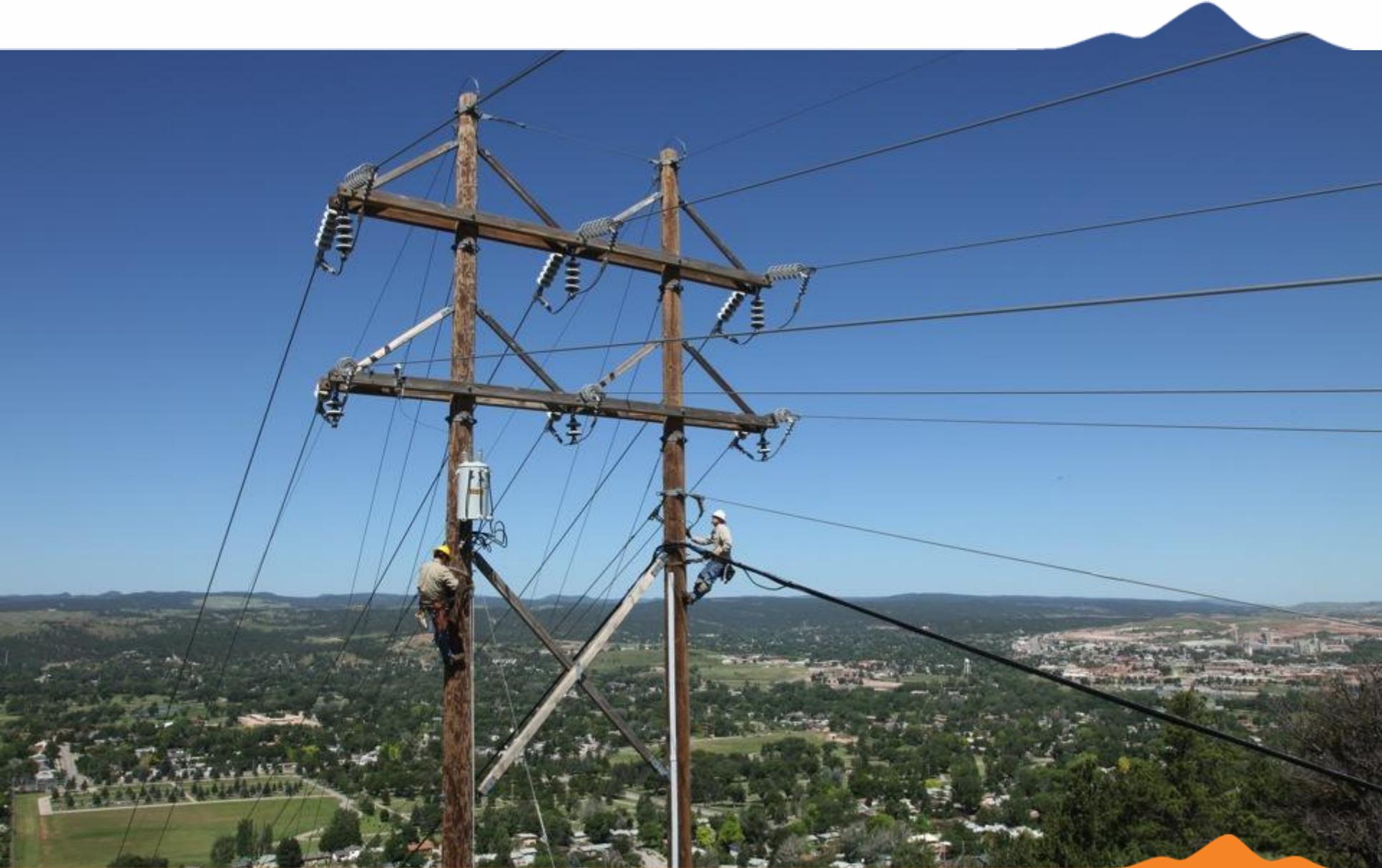
Measure Life

- Measure life is one of the technical assumptions used in development of the electric DSM plan
- Different measures have different lifecycles. Examples of average lifetimes for residential measures based on a recent DSM potential study completed for Black Hills:
 - Central Air Conditioning – 14 years
 - Evaporative Cooler – 12 years
 - Screw-in LED – 12 years
 - HE Dishwasher – 12 years
 - ENERGY STAR Refrigerator – 16 years
- Black Hills typically claims the savings per measure for the year it is installed

Legislative and Regulatory Process

- Legislatively Directed
 - HB07-1037: Sponsored by Rep. Claire Levy (D-Boulder)
 - ❑ Created the electric and natural gas DSM programs
 - ❑ House vote: 50 to 15
 - ❑ Senate vote: 24 to 11
- Regulatory Process
 - Electric DSM plans are governed by statute (C.R.S. § 40-3.2-104)
 - PUC-approved electric DSM plans and related tariffs
 - Black Hills' electric DSM plans typically cover three years

Questions & Discussion



Black Hills Corporation

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Questions?



Municipal & Cooperative Utility Programs

- Tri-State Generation & Transmission
 - Jon Beyer
- Holy Cross Energy
 - Chris Hildred
- Platte River Power Authority
 - Paul Davis
- Colorado Springs Utilities
 - Mark James



TRI-STATE G&T

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Tri-State Energy Efficiency Products

Colorado Energy Efficiency Workshop

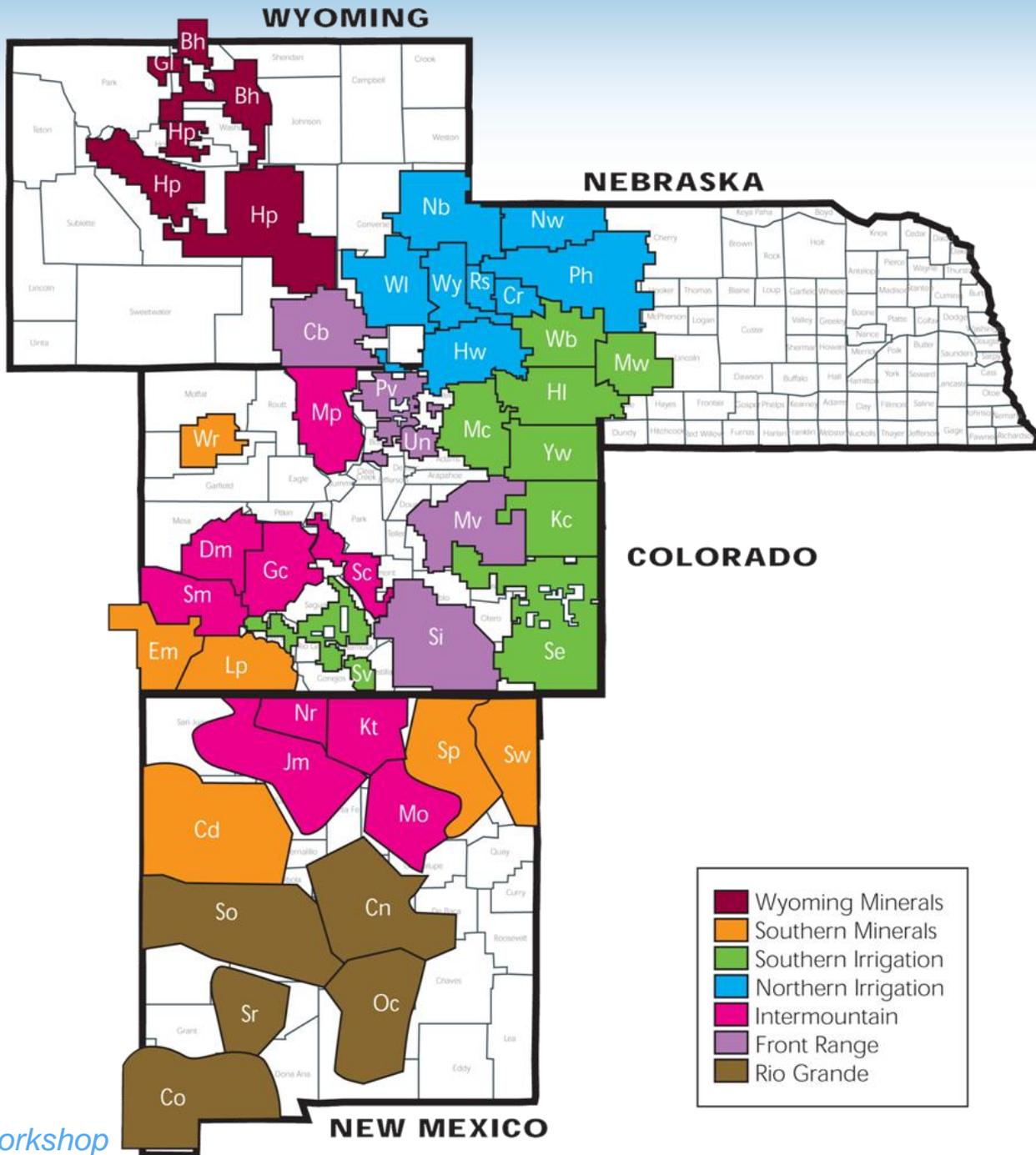
October 23rd, 2015



About Tri-State G&T

- Wholesale electric power supplier owned by the 44 electric cooperatives it serves
 - New Mexico (12)
 - Colorado (18)
 - Wyoming (8)
 - Nebraska (6)

- Founded in 1952
- Headquartered in Westminster, Colorado





Energy Efficiency

Tri-State



Fuel



Generation



Transmission

Member System Opportunities



Distribution

Tri-State and Member Systems



Energy Efficiency



Energy Shaping



Demand Response



2015 ES & DR Products

- 94.1 MW – Energy Shaping
 - 5 ES Products have enrollment

- 134.7 MW – Demand Response
 - 6 DR Products have enrollment

- 259 MW - Performance Products
 - 3 Products have enrollment

Energy Efficiency Products (EEP) Program Objectives



- Through rebate incentives, buy down the first cost of electric technologies that represent a value for Tri-State and its Member Systems through reduction of future costs
- Promote new electric technologies that are mature to core product offerings and remove technologies that no longer have value
- Evaluate promising new electric technologies through pilot product opportunities
- Provide alternate energy efficient technologies to promote wise use of energy
- Leverage Member System services to deploy product offerings
- Enhance Member Systems' member services activities



2015 EEP Program Offerings

- Premium Efficiency Motors
- Variable Speed Drive Retrofit
- Electric Water Heaters
- Heat Pump Water Heaters
- ENERGY STAR® Appliances (refrigerators, freezers, clothes washers and dishwashers)
- ENERGY STAR Air Conditioners
- Air Source Heat Pumps
- Ground Source Heat Pumps
- LED Parking Lot Lighting
- LED Refrigerated Case Lighting

2015 EEP Program Offerings (continued)



- Low Income Weatherization
- LED Lamps
- Commercial Lighting Replacement
- New Construction Commercial Lighting
- Electric Thermal Storage Units / Thermal Slab
- Smart Grid Pilot
- Industrial / Agricultural Processing Audit Pilot
- Commercial Refrigeration Audit Pilot
- Custom Energy Efficiency Pilot



2012 Review

- Total Rebates: 9,018
- Total Incentives: \$1,329,845
- Colorado Incentives: \$1,114,393
- Incremental Annual Savings: 8,825,584 kWh



2013 Review

- Total Rebates: 10,620
- Total Incentives: \$1,403,254
- Colorado Incentives: \$1,220,570
- Incremental Annual Savings: 18,354,683 kWh



2014 Review

- Total Rebates: 11,740
- Total Incentives: \$2,131,637
- Colorado Incentives: \$1,842,531
- Incremental Annual Savings: 15,851,510 kWh

EEP Annual Assessment



- We continually assess economics and value of each program
- Annual review process with the membership occurs in September and October
- Feedback provided from Member System staff and CEOs along with Tri-State Board of Directors
- Will be taking recommendations to our Board of Directors in November



TRI-STATE G&T

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Cooperative



Holy Cross Energy



A Touchstone Energy® Cooperative 

Energy Efficiency Program Summary

Chris Hildred

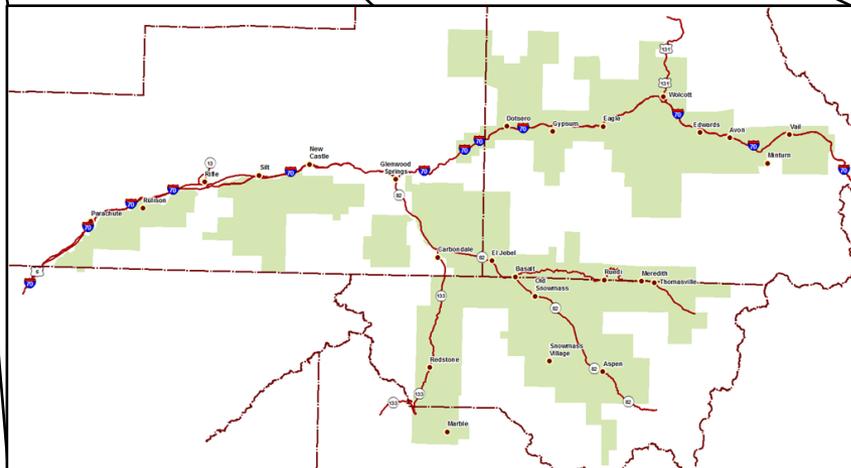
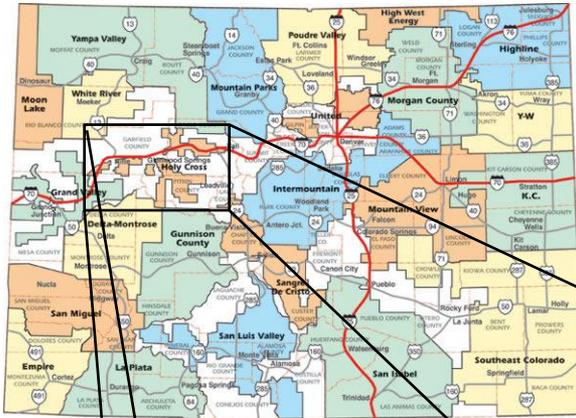


NREL, October 22, 2015

Holy Cross Energy



A Touchstone Energy® Cooperative



- Cooperative electric association founded in 1939
- Eagle, Garfield, Pitkin (Gunnison, Mesa) counties
- 55,000 retail meters
- 18 meters/mile
- 1,200 GWh annual sales
 - 7th largest CO electric utility
- \$120 million annual revenue
- Not a member of Tri-State

WE CARE Program (EE & DG)



A Touchstone Energy® Cooperative 

- Program started in 2004
 - Cash incentives focus on appliance & lighting
 - Education (5th grade curriculum & kit)
 - Complimentary audits
 - Funded through a 2% rider on every bill
- Expanded offerings and focus beginning in 2013
 - HCE's board adopted an EE savings goal
 - 33 GWh cumulative savings at end of 5 years
 - 2.5% of forecast retail sales for 2017
 - About 3.5 FTE's working on EE/DG efforts

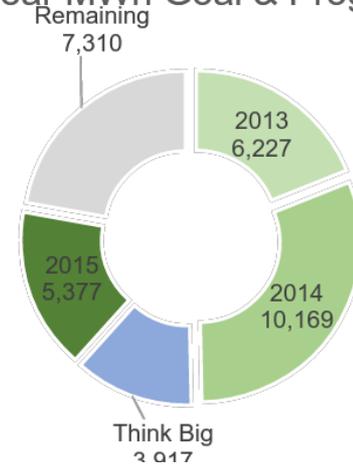
Program Impact



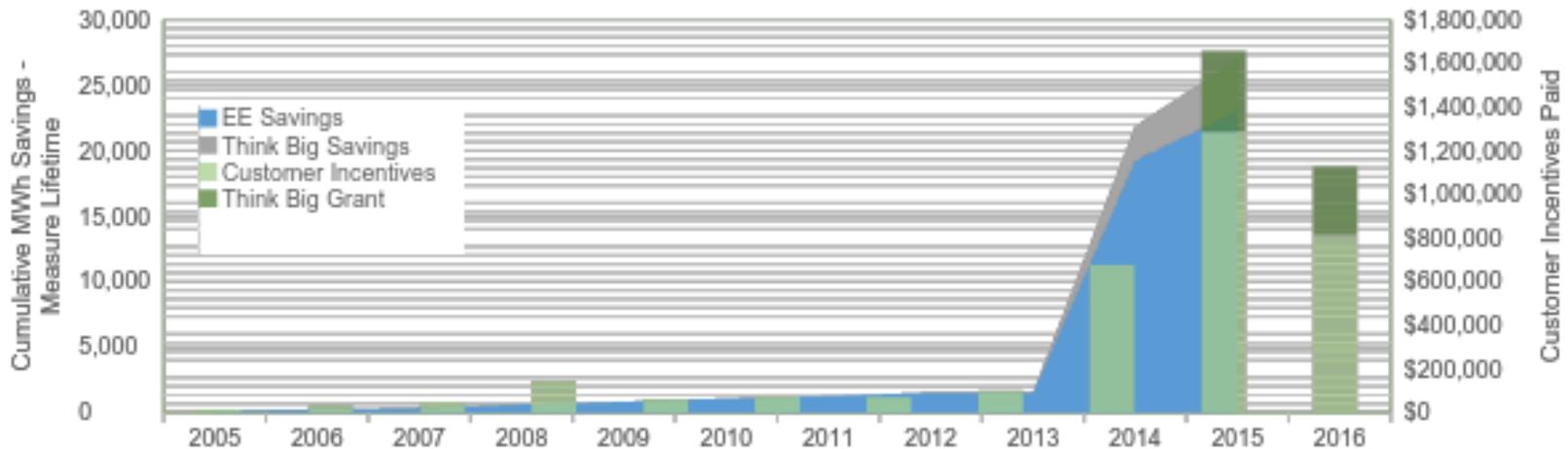
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- **Progress: 25.7/33 GWh** (as of 9/30/15)
 - Average 9.3 incremental GWh annually so far
 - Estimated weighted life 10.6 years
 - About 80% savings from commercial sector
 - 2016 Budget - \$650,000 in incentives

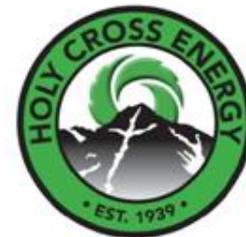
5 Year MWh Goal & Progress



Cumulative EE Savings



Reporting



A Touchstone Energy® Cooperative 

- Measurement and Verification
 - Previous savings are deemed
 - Similar assumptions from Xcel's DSM technical manual
 - Weather normalized bill analysis
 - Pre/post inspections for large commercial projects
 - Audit reports on weatherization measures (local non-profits)
- Reported savings do not overlap any utility programs
 - Weatherization programs participation
 - CEO & Energy Outreach Colorado
 - HCE reports savings EIA (Form 861) and RUS annually

Eligible Measures



A Touchstone Energy® Cooperative 

- Planning for goals past 2017
 - Changing baselines for many measures
 - Several jurisdictions adopting 2015 IECC
 - Several jurisdictions have consumer requirements
 - If measure installed for requirement or to avoid a fee, no incentive is paid and savings are not counted
- HCE does not have an external requirement for EE program

Thank You



A Touchstone Energy® Cooperative 

Chris Hildred
Holy Cross Energy
Power Supply/Special Projects Supervisor
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Municipal & Cooperative Utility Programs

- Platte River Power Authority
 - Paul Davis
- Colorado Springs Utilities
 - Mark James



Questions?



Break

Colorado Energy Office Programs

Christian Williss

CEO's Director of Programs & Initiatives

Energy Performance Contracting

Agricultural Energy Efficiency

Public School Energy Efficiency

Energy Performance Contracting

- Statewide program launched in the mid-1990s; available to state agencies, higher education, and local government
- Financial tool used by public sector building owners to finance energy efficiency improvements
- Used by 140 jurisdictions to date; ranked #4 by Energy Service Coalition's *Race to the Top* for construction investment
- 7 million to 32 million in kWh savings from new projects annually (85 million kWh since 2011)

Energy Performance Contracting

- Savings are measured, reported, and verified through:
 - Investment grade audits
 - Guaranteed energy savings
 - Measurement and Verification
- CEO requires that projects leverage outside resources including utility rebates and grants; potential for double counting exists



Energy Performance Contracting

- Equipment life for efficiency improvements varies
- Enabling legislation establishes the following:
 - Financing term cannot exceed cost-weighted average of useful equipment life
 - Minimum of 3 years for the savings guarantee/M&V for state agencies and higher education, 2 years for local government; can be extended at discretion of building owner
 - Framework for managing effectiveness of the program by CEO, requirement that ESCOs reimburse building owners in the event of a savings shortfall

Agricultural Energy Efficiency

Colorado Dairy and Irrigation Efficiency Program

- Statewide program launched in June 2015; focused on areas with high concentration of agricultural activities
- Turnkey energy efficiency services: free energy audits, technical support, facilitate access to financial resources
- 80 producers annually (40 dairies/40 powered irrigators)
- Participants in 2014 pilot program averaged savings of 29,252 kWh



Public School Energy Efficiency

Energy Savings for Schools

- Statewide program launched in September 2015; focused primarily on small/rural school districts
- Turnkey energy efficiency services: free energy audits, technical support, facilitate access to financial resources, energy coaching
- 24 schools annually
- Annual kWh savings TBD (240,000-475,000 kWh annually)

Agricultural & Public School Energy Efficiency

- Savings are measured, reported, and verified by CEO's contractors: verification of installed improvements, modified savings calculations as needed
- Equipment life for efficiency improvements varies
- Both programs leverage outside resources including utility rebates, state and federal programs; potential for double counting exists
- ESS Program provides support for multiple programs required by statute; no requirement for savings

Colorado Energy Office Programs

Joseph Pereira

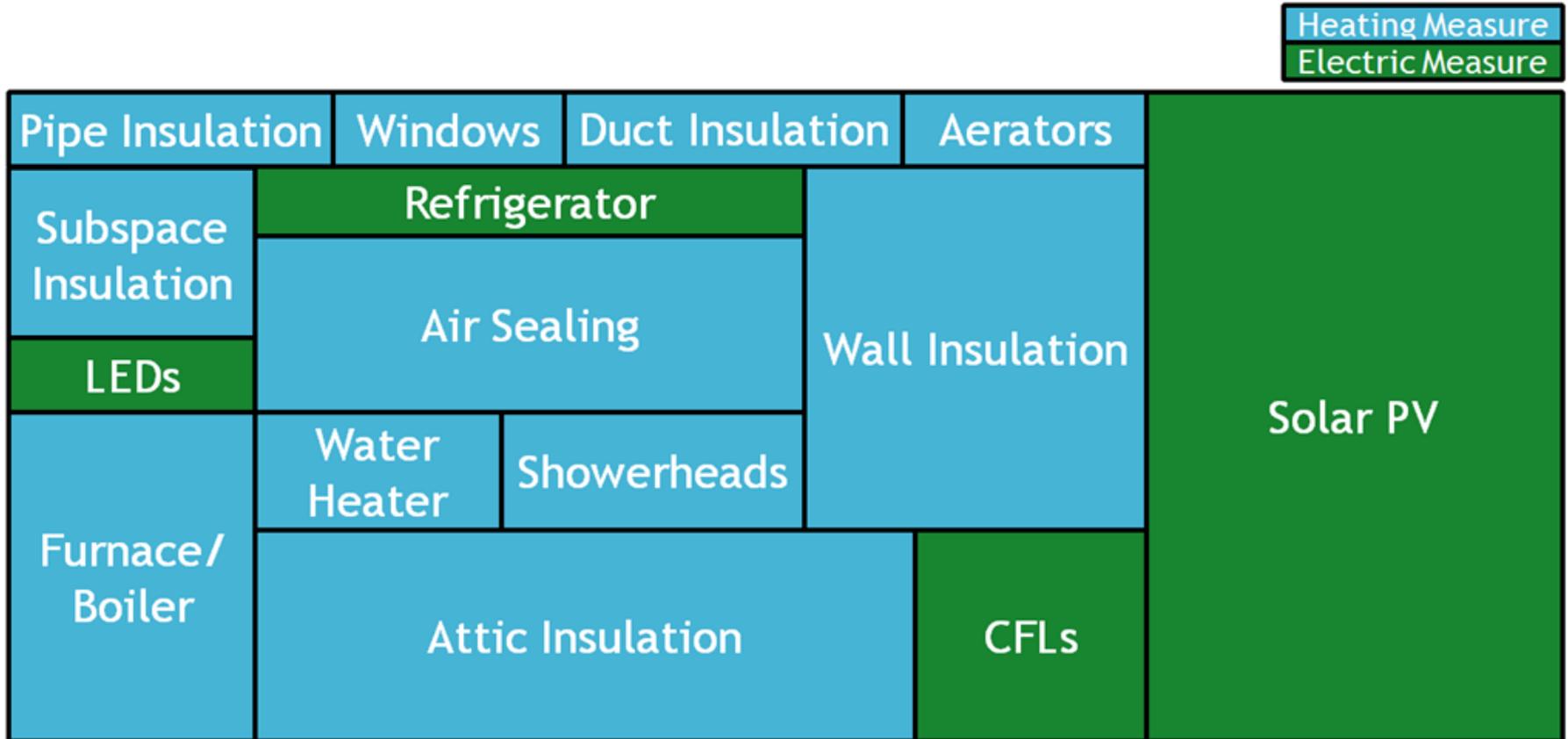
CEO's Director of Weatherization



Weatherization Assistance Program

- Federally authorized, income-qualified program serving all 64 counties in the state
- Provides free, cost effective, energy efficiency measures to reduce home heating costs and electric baseload
- Serves both single-family and multi-family housing stock (3,000+ units annually at current funding levels)
- Implemented through 8 local sub-grantee agencies
- Key leverage point for utility low-income DSM
- Multiple levels of quality assurance inspection

Wx Measures



Weatherization Assistance Program

- Savings are measured, reported and verified through:
 - Uniform site-specific auditing
 - Quality assurance inspection
 - Customer utility bill analysis
- Measure life varies; ranging from 10 to 30 yrs.
- CEO allows for measure buy-in to balance bridge differences between federal and utility cost-effectiveness standards.

Weatherization Assistance Program

- Program is authorized and funded through both federal and state sources (WAP, LEAP, State Severance Tax, Revenue Contracts).
- Each funding source requires SIR of >1 .
- Potential exists for double counting between state reporting and utility DSM reporting.
- Likely and established avenue for investment in Clean Energy Incentive Program (CEIP).



Questions?



Local Government & Non-profit Programs

- City of Denver
 - Liz Babcock
- Garfield Clean Energy / CLEER
 - Alice Laird



DENVER
THE MILE HIGH CITY

Denver's Efficiency Programs and the Clean Power Plan

Elizabeth Babcock

Manager, Air, Water, and Climate group

City and County of Denver

October 19, 2015

- Community efficiency programs
 - Denver Energy Challenge
 - 4.2M kWh, 919K therms, 8.3K tons CO₂
 - DOSP low-income ee program
 - Included in above numbers
 - City Energy Project
- International Energy Conservation Code (IECC)
- Municipal operations
 - In 3 years, 7% reduction in electricity= 3.5K mtCO₂e
 - Street lighting conversion to LED

- Denver Energy Challenge
 - Deemed savings, 5% QA field checks, biennial comparison with actual utility data
- DOSP low-income ee program
 - Deemed savings
- City Energy Project
 - Actual utility data
- IECC compliance
 - Training
 - Accela

- A majority of participants in Denver's programs simultaneously participate in Xcel's DSM programs. Our savings are captured in their DSM reports.
- We have driven up participation and Denver accounts for ~60% of Xcel's totals in CO, while we only consume ~20% of electricity.
- Exceptions would be savings from benchmarking and disclosure, updates to our energy code, and LED street lighting conversions outside of Xcel incentive programs.

- All community programs are purely voluntary at this time
- Denver is exploring options for building efficiency policy
- XO 123 requires municipal buildings to reduce energy use by 20% by 2020
- Frequency of code cycle updates are not mandated



Garfield Clean Energy
County-wide Energy Efficiency Programs
Alice Laird
Director, CLEAR



BE AN ENERGY HERO!



Sally Brands is an energy hero. She retrofitted the lights and added insulation to the attic and hot water pipes in her 1896 Rifle building. She's now saving from 33 to 65 percent on her energy bills. Sally received rebates from Garfield Clean Energy. She is participating in the Garfield Clean Energy Challenge. You can be an Energy Hero, too!

Call Rob or Erica at CLEER today (970-704-9200) to get started.

Find out more at www.garfieldcleanenergy.org.

Be an Energy Hero.



**GARFIELD
CLEAN ENERGY**

BE AN ENERGY HERO!



Nelson Oldham and his colleagues at Dos Gringos Burritos & Cafe Ole are working hard to cut their energy bills. Dos Gringos Burritos & Cafe Ole received rebates from Xcel Energy and Garfield Clean Energy. They are participating in the Garfield Clean Energy Challenge. And Nelson is an Energy Hero! You can be an energy hero, too! Call Rob or Erica at CLEER today (970-704-9200) to get started. Find out more at www.garfieldcleanenergy.org. Be an Energy Hero.



BE AN ENERGY HERO!

Ron Mittleder and his family are staying a lot cooler and saving money this summer.



Ron caulked joints in his walls, replaced his old fridge and freezer, replaced his lights with more efficient models, and had new insulation blown into his attic. He's now seeing a drop of roughly 20 percent in his electricity bills.

Ron is participating in the Garfield Clean Energy Challenge.

And Ron is an Energy Hero! You can be an Energy Hero, too!

Call Rob or Erica at CLEER today (970-704-9200) to get started.

Read more at www.garfieldcleanenergy.org.

Be an Energy Hero.





Results and Measurement

- **Residential and Commercial**

- Annual savings: 3,608,262 kwh
- Deemed savings, based on DOE reporting
- Many projects use utility rebates – GWS, Holy Cross, Xcel Energy - and are counted by utility programs

- **Government energy efficiency projects**

- Utility data
- Navigator data



www.garfieldenergynavigator.org

NEW WASTEWATER PLANT GLENWOOD SPRINGS

START OVER

ART SUMMARY

IRRENT PRIOR

Energy Use in kWh during the period

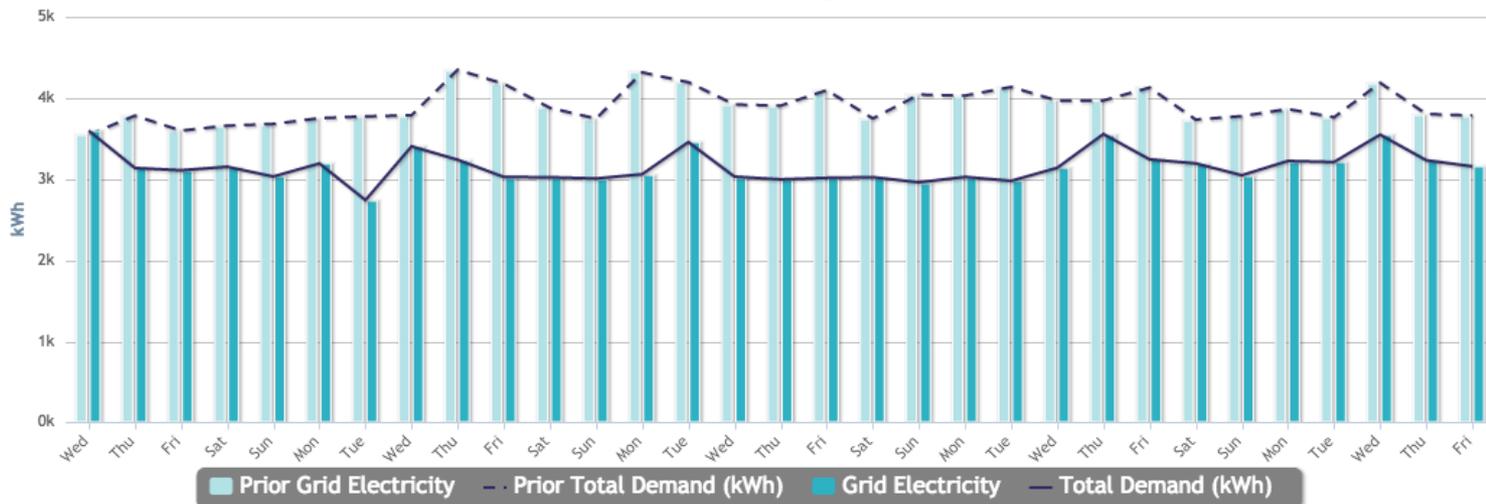
	CURRENT	PRIOR	CHANGE
GRID	97,677	121,023	-23,346
WATER	97,677	121,023	-23,346
			-19%

Cost @ \$9577.83 \$11867.04 \$-2289.22
 kWh from bills



Electricity Use (kWh) - Wed Jul 1st, 2015 - Fri Jul 31st, 2015

vs. Wed Jul 2nd, 2014 - Fri Aug 1st, 2014



<< PRIOR

COMPARE PRIOR: **YEAR** GO TO: Choose date... ▾

NEXT >>

WASTE WATER PLANT CARBONDALE

START OVER ABOUT

ART SUMMARY

it energy terms of average US homes.

CURRENT 161 **PRIOR 197**

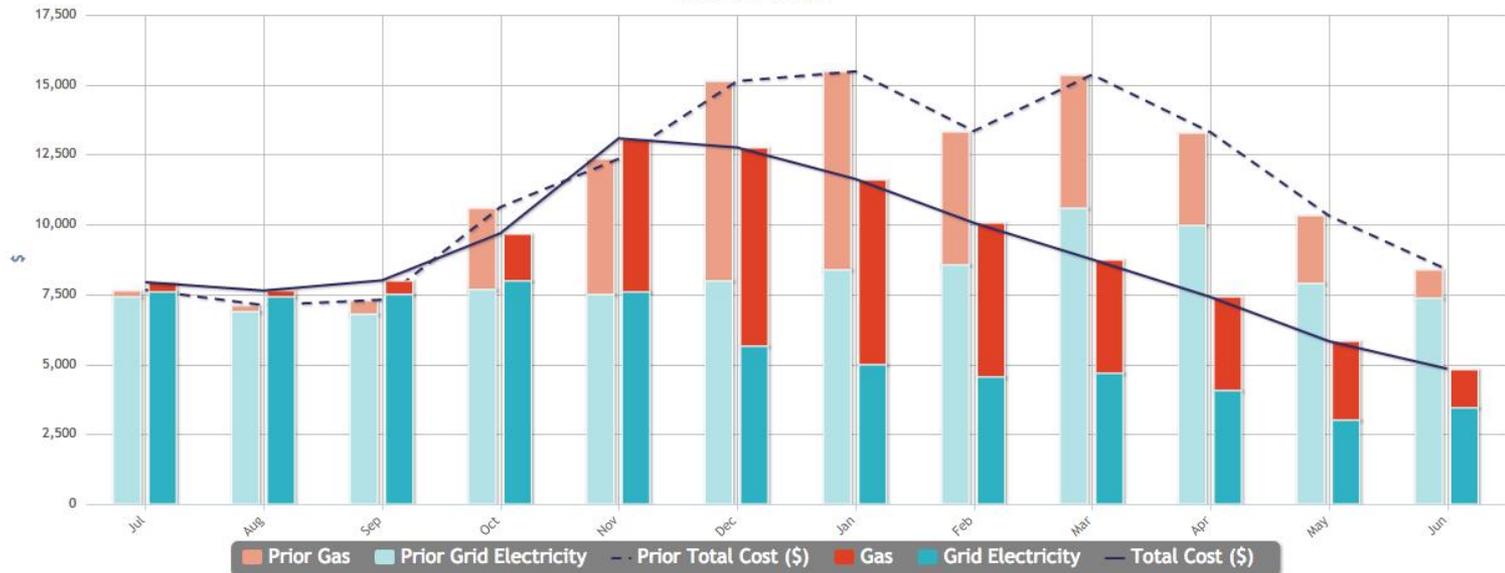


Energy Use during the chart

CURRENT	PRIOR	CHANGE
\$68,580	\$97,267	\$-28,687
\$39,023	\$39,097	\$-74
\$107,603	\$136,364	\$-28,761 -21%



Cost of Energy Use (\$) - Jul 2014 - Jun 2015
vs. Jul 2013 - Jun 2014



<< PRIOR

COMPARE PRIOR: **YEAR**

ESTIMATED SAVINGS

GO TO: Choose date... ▾

GS CARBONDALE

GLENWOOD SPRINGS

NEW CASTLE

RIFLE

GARFIELD LIBRARIES

SILT

PARACHUTE

RFTA

GARFIELD COUNTY

COMMUNITY PARTNERS

RFSD SCHOOLS

CARE

COLO. MTN. COLLEGE

ALPINE BANK



- Collaboration and standardizing approaches with neighboring counties – Energy Smart Colorado
- Improving access to data for verification
- Accounting for energy savings from behavioral and operational changes
- Creating a more sustained approach

POST INDEPENDENT

GLENWOOD SPRINGS

Your free community newspaper

postindependent.com

Volume 121, Number 282

SUNDAY, October 9, 2011

Driving job creation, energy savings

Garfield Clean Energy counts nearly \$3M spent on efficiency, renewable energy

John Colan
Post-Independent Staff

As local communities continue to suffer from the current economic slowdown, an agreement and businesses plan to share resources and pare budgets down to the bare minimum, the idea of spending money to save energy may seem counter-intuitive to some.

But to others, the question is not simply whether putting alternative energy systems to work is costly, or will save energy and money in the long run.

Yes, to some, it has been a matter of survival.

"It would have been in the unemployment relief line if it weren't for this," said Mark McLean, a Carbonado architect, referring to Garfield County's expanding energy efficiency and renewable energy market.

"It is a pretty small fish, but it's been a huge difference to me," he added.

"It is the growing commitment to clean energy, from generating renewable energy through solar and wind, paired to aggressive energy efficiency programs by local governments and residential and commercial property owners.

McLean, whose architectural business took a nosedive after the financial meltdown of 2008, also was a certified energy auditor thanks to a class he took at the Solar Energy International in Carbonado.

He started conducting energy audits, and found that in doing so he was generating commission for architects in rock, too. Hence, his ability to survive, even thrive, without resorting to public assistance.

Is McLean's story one that has broader implications, or was he just lucky?

Home built in clean energy

The upsurge in interest and participation among businesses and residents, as well as government, is now a fact in Garfield County.

Dozens of public buildings and busi-



John Colan Post-Independent Staff

Lyn Dwyer, owner of Dwyer Flowers & Greens near West Cañon, is proud to show off the energy curtains installed in her commercial greenhouse. In this photo, the curtains are shown overhead in a partially open position. They can be drawn all the way across the roof of the greenhouse to keep it cool on hot sunny days, or to hold heat in on cold nights.

nesses, along with scores of private homes, are using some type of application of clean energy.

According to Alice Laird of Carbonado, director of Garfield Clean Energy, the organization has "stimulated demand for energy upgrades" allowed by local firms and installed by local workers skilled in energy improvements.

"She reported that more than \$600,000 has been spent on energy retrofits and energy conservation upgrades for homes, homes and affordable housing units.

"Over \$2.3 million has been invested in renewable energy," she notes in a written statement, "including demand for products and firms that install solar systems."

"She said more than 10 businesses and 1,000 households have signed up for the Garfield Clean Energy Challenge, which

involves energy evaluations and subsequent energy efficiency improvements.

" savings to date, as a result of these improvements, have topped \$210,000 for homes and homes whose upgrades were made, and she expects those numbers to rise.

For example, Lyn Dwyer, owner of Dwyer's Flowers & Greens, a plant nursery and greenhouse, south of New Castle, worked with an energy coach who helped her find an "energy curtain" system.

The curtains, installed inside the greenhouse reflect sunlight and provide shade to the heat of the summer, and can be used as a type of insulating blanket for cooler times. They open and close using an automated system.

"It's a \$60,000 investment through GCE, she said, because the price tag for the curtains

is more than what she could afford the project.

"I saved the curtains cut her propane bills by 25 percent last year. Now she plans on making further investments to cut her bills even more.

Noting that tracking energy use is the first step to saving energy, Laird reported that 47 government buildings across Garfield County are receiving a new website, garfieldenergymonitoring.com, to track their energy consumption. With the data collected, building managers are adjusting lighting, heating and cooling to save energy bills.

"School districts, too, are getting involved.

Laird said 26 schools in the Roaring

970-945-5212

POSTINDEPENDENT.COM

FRIDAY, OCTOBER 9, 2011 A3

'A direct result of this is job creation'

CLEAN (By Staff)

Fork and Garfield No. 2 school districts have signed on for "innovative data-driven energy conservation programs."

The schools have cut more than \$100,000 from the Roaring Fork District's utility expenses, and \$60,000 in savings in the Garfield No. 2 district, she said.

'Direct result is job creation'

McLean, along with a dozen or so other area business owners and individuals, testified recently at a work session of the Garfield Board of County Commissioners (BOCC) in support of combined government funding for, and investment with Garfield Clean Energy, an inter-governmental association formed in 2006 (It was previously called Garfield New Energy Communities Initiative).

(Kevin Mysorek, a member of the Climate Action Committee for the town of New Castle and a professional energy auditor for Holy Cross Energy, noted that Garfield Clean Energy has been instrumental in helping the town identify its own energy efficiency standards for building codes, and increasing the energy efficiency of town government buildings.

"We need this group to help us as a county," she said, warning that Holy Cross Energy has "They're extraordinarily knowledgeable. We're going to draw all the lines."

Plus, she said, "We need them to get our contractors up to speed" concerning installation, maintenance and repair of clean energy systems.

"A direct result of this is job creation," Mysorek said, mentioning that the clean energy industry provides jobs for electricians, builders and others who have been hired by the ongoing collapse of the regional construction trade.

She said Holy Cross Energy has embarked on a new energy efficiency program with the help of Garfield Clean Energy. It's in keeping with the utility's philosophy that "If people are spending less on their utility bills, they have more money to spend on other things."

Energy industry on bend

Shel Long, a spokeswoman for EnCana Oil and Gas (USA), noted that the natural gas industry is the biggest user of solar panels in Garfield County. The panels generate power for remote well monitoring systems. Long said there are roughly 2,500 solar panels in use by EnCana alone.

EnCana also heavily invested in a local government and private sector push to establish compressed natural gas (CNG)



John Colan Post-Independent Staff

In June, the Clean Energy Collective hosted a ribbon cutting event for its new solar panel array at the Garfield County Airport near Rifle. The project provides clean solar energy to customers of Holy Cross Energy, also purchase one or more panels in the system.

as a viable vehicle fuel in the area. The effort is under way with a CNG fueling pump that opened this summer at the Shell gas station in Rifle owned by Kirk Swallow.

EnCana has 30 CNG vehicles in its fleet and is planning for more. Other area gas drilling companies are working on similar vehicle conversions.

Long said EnCana was invited to get involved with Garfield Clean Energy last spring, as the organization was preparing to renege itself as the Garfield Clean Energy Authority.

The company jumped at the chance, she said, understanding its established track record of support for energy efficiency projects.

"Over the past two years, we've made Community Investment Funds totaling over \$250,000 related to energy efficiency," Long said, "such as a grant to Roaring Fork Habitat for Humanity for its first 'net zero' house."

The issue produces as much energy through solar power as it consumes on a yearly basis.

Other groups have helped pay for energy efficient natural gas boilers in new libraries in Rifle and Parachute, boiler upgrades for Rifle City Hall and the Rifle Senior Center, and energy efficiency studies for the Rifle Housing Authority's stock of market housing, she said.

A move to a fueling station

First established in 2008 under the name Garfield New Energy Communities Initiative, or GNECI, the organization began as one of 14 community clean energy



John Colan Post-Independent Staff

In April, Shell station owner Kirk Swallow opened the county's only compressed natural gas (CNG) fueling station. It's located in downtown Rifle. CNG burns cleaner than gasoline, and taps domestic energy sources rather than using imported oil.

CLEER: Clean Energy Economy for the Region, under a contract with Garfield County.

The next step in its evolution is aimed at moving Garfield Clean Energy from its current status as an inter-governmental agreement among the nine partners in establishing it to a free-standing clean energy authority under provisions set out by the state Legislature.

The Garfield Clean Energy Collaborative, according to an inter-governmental agreement already signed by the towns of

Rifle and New Castle, calls for participating local governments to contribute funding based on a formula that takes into account the community's population and its energy use.

Garfield County's proposed share, for instance, is \$165,000, while Parachute is being asked to pay \$6,000 and the Library District \$5,000.

Laird and others with Garfield Clean Energy are looking to win the governments of all six towns over the coming weeks to ask elected leaders to sign up.

WEATHER	Local	42
	Calendar Month	44
	State	45
	West & North	36
	Canada	44
	Spain	40
	California	40
	Connecticut	42
	Hawaii	42

STATE
TO THE RESCUE
A new Food Network show, "Restaurant Impossible," hopes to give struggling chefs in trouble the tools to thrive.
PAGE 45

NATION
JUST LIKE US
The Occupy Wall Street protest, which began three weeks ago as a group of mostly young people camping out on the streets, now features different ages, backgrounds and professions.
PAGE 46

PREP SPORTS
PIRATES ROLL
Playing below its potential, Roaring Fork volleyball lost to Clifton Saturday. The visiting Pirates knocked out the host Rams in three games, 25-23, 25-21, 27-7.
PAGE 49





Questions?



Private Sector & Other Opportunities

- Energy Efficiency Business Coalition
 - Lauren Poole
- Cadmus Group
 - Vanessa Barbarisi
- Southwest Energy Efficiency Project
 - Howard Geller

Energy Efficiency Opportunities in the Private Sector

Lauren Poole, Executive Director
EEBC

doing more with less

Private Sector Building Types - Commercial

- Small office buildings
- Commercial and multifamily
- Retail and restaurants
- Car dealerships
- Banks
- Private schools

Hotels and resorts

Warehouses

Data Centers

Hospitals

Manufacturing



Energy Efficiency Opportunities – Technical Areas

- Envelope upgrades (e.g., insulation, window glazing, etc.)
- Efficient HVAC systems and controls
- Efficient lighting and controls
(new LED lighting offer 50% to 80% gains in efficiency)
- Water conservation linked to efficiency



Private Sector Market

- Private sector largely un-tapped
- Most upgrades lighting and controls
- Markets with largest potential for comprehensive retrofits
 - Private commercial building sector (\$14 to \$34 billion)
 - Health and hospitals (\$15-\$26 billion)
 - Educational facilities (K-12) (\$16-\$29 billion)

Source: 2013 Report - LBNL and National Assoc. of Energy Service Companies



Case Study – EE Retrofit 1660 Lincoln Street

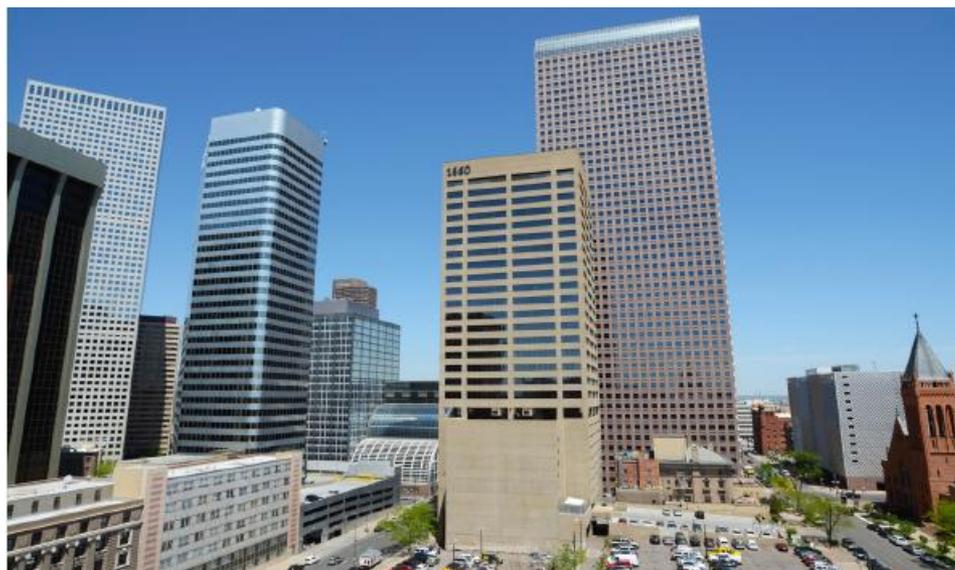
EE upgrades included improving and/or replacing

- Cooling tower
- Chiller
- Steam boiler
- Pump and motor
- Building automation system
- Building envelope upgrades

Incentives:

Property value increase of \$900,000

Xcel rebates: \$30,000



EE upgrades decreased energy use intensity 56% and energy cost 22%



Case Study – Data Center

- 470,000 sf
- Airflow management in white space and auxiliary rooms
- Variable speed drives and high efficiency motors
- Efficient humidifiers
- Efficient cooling system
- Estimated annual energy savings: \$623,000



Utility Incentive: \$698,000



Case Study – Aardex Centre

- Double LEED Platinum
- 186,000 sf
- Low-velocity underfloor HVAC
- Chilled beam cooling with radiant heat for perimeters
- Low-emissivity glass (Solarban 70)
- BAS
- Daylighting
- 100% energy offset by wind energy

Incentive: Xcel EDA \$100,000

- Expected energy reduction: 37%
- Expected energy savings: \$80,000/yr



The Aardex Centre in Golden, CO is second LEED Double Platinum building in the country.



Case Study – Brown Palace Hotel

- Saved 26% on electricity costs
- New EMS
- HVAC upgrades
- Building envelope upgrades
- Lighting retrofits
- Behavior change – staff
- Laundry upgrade
- Built in 1892
- 300,000 sf
- Raised ES score from 22 to 33

Incentive: \$183,527 Xcel rebate



Case Study – OrePac Warehouse

- 140,000 sf
- Replaced old lighting with T8 high bay fixtures with motion sensors
- Estimated annual energy savings: \$25,000 (178,000 kWh)

Incentive: \$36,600 in Xcel rebates



Utility DSM Incentives

- Energy design assistance program
- Rebates for EE products include
 - LED lighting
 - Efficient HVAC systems
 - Improved insulation, air sealing, etc.
 - Smart thermostats (new)



EEBC Contact

- Lauren Poole, Executive Director
- lauren@eebco.org
- 720-274-9764
- www.eebco.org



The logo consists of the word "CADMUS" in white, uppercase, sans-serif font, centered within a solid blue rectangular background.

CADMUS

A yellow horizontal bar with a white arrow pointing to the right, positioned to the left of the main title.

Real Time Measurement and Verification

Vanessa Barbarisi

October 23, 2015



How Can EM&V Help

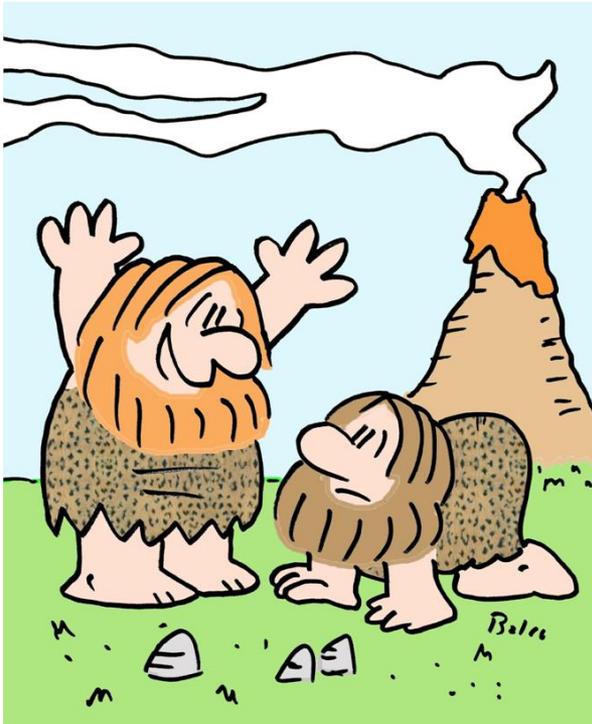
Need to
facilitate
implementation

- Better use of new data
- Quick feedback
- Transparency and early discussions
- In-depth Analysis

It is a capital mistake to theorize before one has data.

– [Sherlock Holmes](#)

Real Time Evaluation (RTE) Versus Traditional Ex-post Evaluation



- **Old Paradigm.** Ex-post audit like
- **New Paradigm.** Part of delivery
- Really is **RTM&V**
- **Ex-Post.** In Depth, rigorous, great insight
- **RTE.** Quick Feedback

"Man, you've got to try this 'walking upright' stuff! — it's like a total paradigm shift!"



What Can RTE Do?

- Open up significant new opportunities
- Help get hard savings
- Speed up program design/redesign
- Redirect funding to more impactful programs





RTE Methodology

Takes place during delivery

Iterative rather than one-off (on-going)

Short time-frame

Use of internal staff along side external/independent consultant

Greater emphasis on process

Immediate lesson-learning over accountability

Enables course correction

Key Performance Indicators

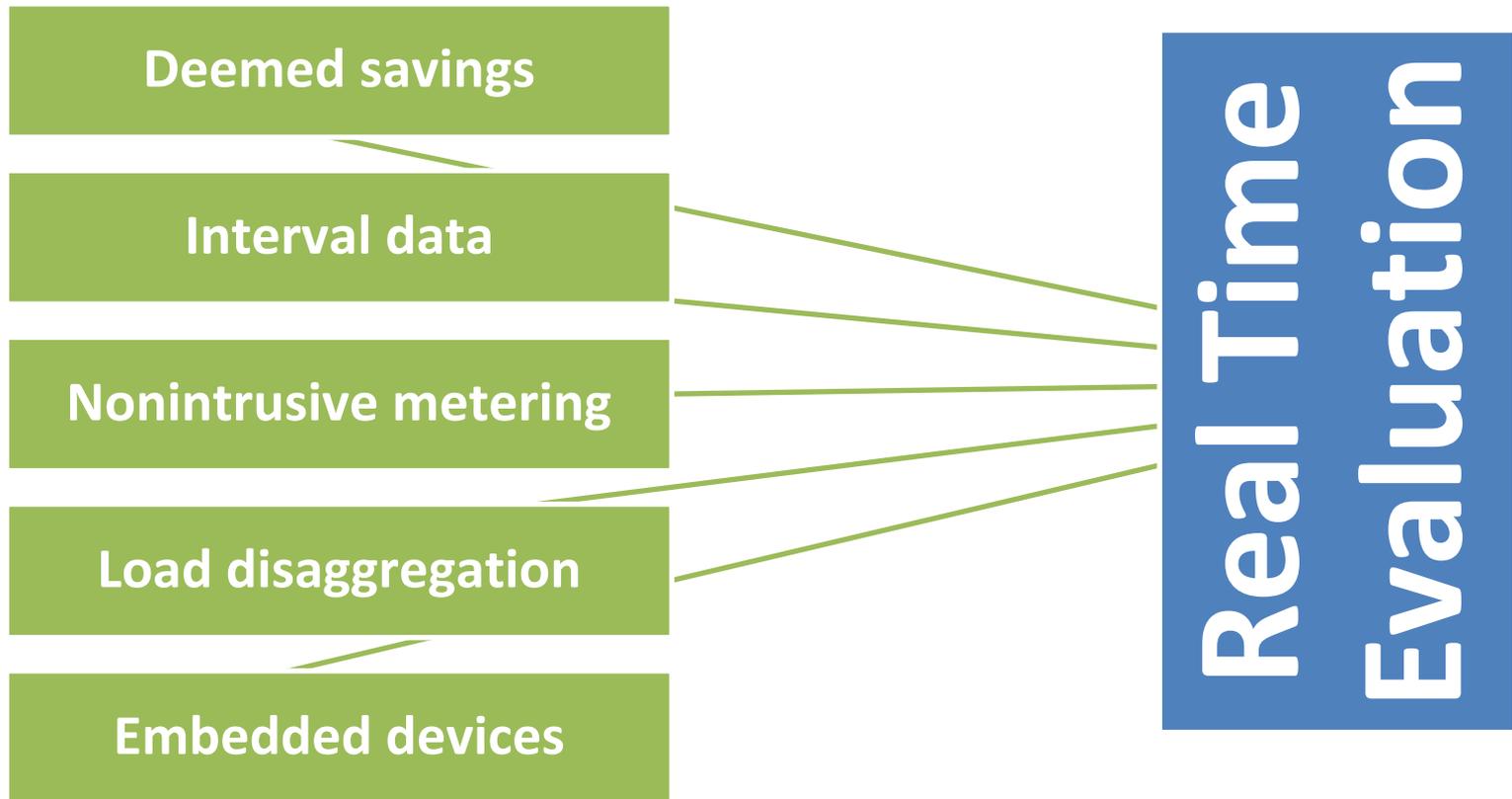
Less rigorous

No one point should be taken seriously

Look for trends

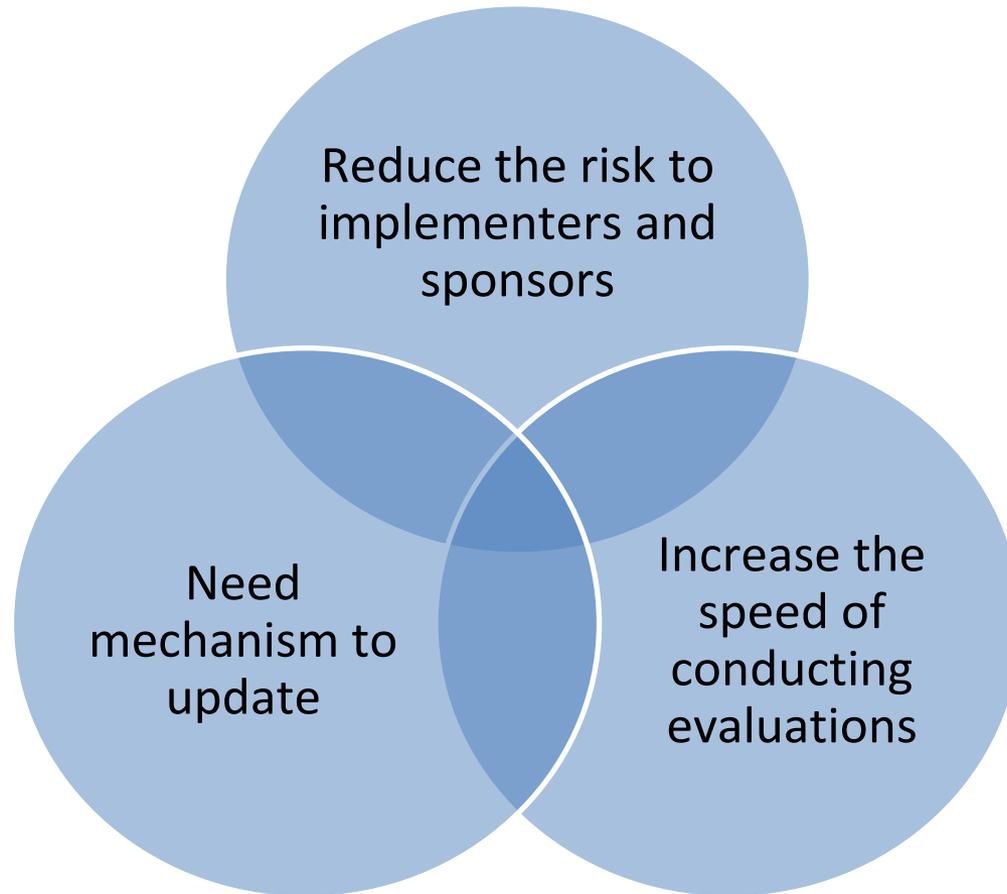


What do We Need for RTE





Deemed Savings





How will smart grid, interval metering, embedded sensors and controls, etc. impact evaluation?

“Evaluation 2.0”

Give evaluators access to rich data that can and should reduce EM&V cost

Make RTE possible

A lot less intrusive to participants



Interval Data

- Through non-intrusive load metering or smart meters
- Replace labor intensive methods
- Valuable input to RTE (possibly REAL real time)
- Develop load profiles that can help with planning, delivery, and cost-effectiveness
- Can significantly lower the cost of EM&V
- May help with load disaggregation
- Less time consuming and intrusive than end-use metering



Monitoring Devices in Equipment

- Complete the puzzle
- Will increase accuracy of estimates significantly
- Reduce the need for field M&V



What do you want out of measurement and verification?

First and foremost, you want evaluation to help and not hinder implementation

Learning what worked and what didn't

Quick feedback at critical decision points

In-depth analysis with the clarity of hindsight using that information to inform next iteration of program or measure installation

Program to work as efficiently as possible, as soon as possible.



How about cost?

RTE will improve cost-effectiveness

Ex-post costs are more predictable



Tradeoff

RTE is not rigorous

Ex-post findings not available until too late

With additional time and better data, a higher degree of rigor is possible.



Bottom Line

RTE is more frequent
(hourly? Weekly?
Quarterly?) -
Depends on the KPI

You need quick
feedback and deep
insight

You need both RTE
and Ex-post

Ex-post can be greatly
improved with RTE

Move toward RTE
being more predictive

More transparency
and early
stakeholders
involvement

Evaluators' biggest fear is concluding that the effort would have been
cost effective ***had it not been for the cost of the evaluation***



Questions?





RAP

Energy solutions
for a changing world

How Can Energy Efficiency (EE) Fit Into a Clean Power Plan (CPP) State Compliance Plan?

Colorado Energy Office
EE and the CPP Workshop

Presented by John Shenot

October 23, 2015

The Regulatory Assistance Project

50 State Street, Suite 3
Montpelier, VT 05602

Phone: 802-223-8199
www.raponline.org

Introduction



- The Regulatory Assistance Project (RAP) is a global, non-profit team of energy experts, mostly veteran regulators, advising current regulators on the long-term economic and environmental sustainability of the power and natural gas sectors. (www.raonline.org)
 - *Non-advocacy; no interventions*



- John Shenot is a Senior Associate at RAP. He previously served 3 years as policy advisor to the Public Service Commission of Wisconsin and 15 years with the Wisconsin Department of Natural Resources as an air pollution regulator and electric utility specialist.

Emissions Rate Credits (ERCs)

- Tradable instrument used for compliance with **rate**-based emissions standards
- Represents 1 MWh of actual energy generated **or saved** with zero associated CO₂ emissions.
- Added to denominator of emissions rate:

$$\text{Emissions Rate} = \frac{\text{Emissions (lbs)}}{\text{Output (MWh)} + \text{ERCs (MWh)}}$$

Allowances

- Tradable instrument used for compliance with **mass**-based emissions standards
- “Cap” on total number available
- Distributed in advance through an allocation, an auction, or a sale
 - Can allocate allowances to a “set aside”
- Regulated sources must surrender one allowance for each ton of emissions

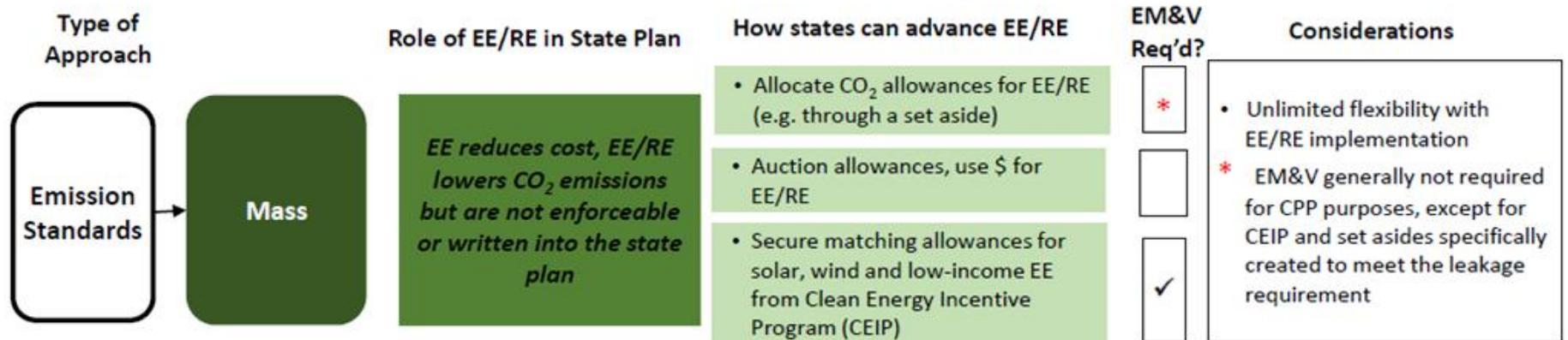


How Does EE fit in the Clean Power Plan?

Type of Approach	Role of EE/RE in State Plan	How states can advance EE/RE	EM&V Req'd?	Considerations
Emission Standards	Mass <i>EE reduces cost, EE/RE lowers CO₂ emissions but are not enforceable or written into the state plan</i>	<ul style="list-style-type: none"> Allocate CO₂ allowances for EE/RE (e.g. through a set aside) Auction allowances, use \$ for EE/RE Secure matching allowances for solar, wind and low-income EE from Clean Energy Incentive Program (CEIP) 	<input type="checkbox"/> * <input type="checkbox"/> <input checked="" type="checkbox"/>	<ul style="list-style-type: none"> Unlimited flexibility with EE/RE implementation * EM&V generally not required for CPP purposes, except for CEIP and set asides specifically created to meet the leakage requirement
	Rate <i>Explicitly written into state plan; Used to generate ERCs and directly adjust reported CO₂ emissions rate of affected EGUs</i>	<ul style="list-style-type: none"> Include EE/RE ERC tracking, trading, and issuance provisions in the state plan Issue ERCs for quantified and verified MWhs from eligible EE/RE measures Secure matching ERCs from CEIP for solar, wind, low-income EE 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<ul style="list-style-type: none"> EM&V plans and M&V reports required EE/RE is explicitly tracked & credited Trading-ready plans facilitate broad access to ERCs EE/RE implemented after 2012 can generate credits starting in 2022
State Measures	State Demonstration Based on Mass <i>Explicitly included as supporting material for state plan – enforceable under state law; State EE/RE policies and measures can be used to help affected EGUs meet mass goal</i>	<ul style="list-style-type: none"> Implement state EE/RE policies and programs (e.g., EERS, RPS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits Secure matching allowances from CEIP for solar, wind and low-income EE 	<input checked="" type="checkbox"/> * <input checked="" type="checkbox"/>	<ul style="list-style-type: none"> Projection of EE/RE impacts required and EGU CO₂ performance required * EM&V Plan for EE/RE measures must be included as supporting material for state plan Backstop emission standards for affected EGUs if CO₂ reductions don't materialize



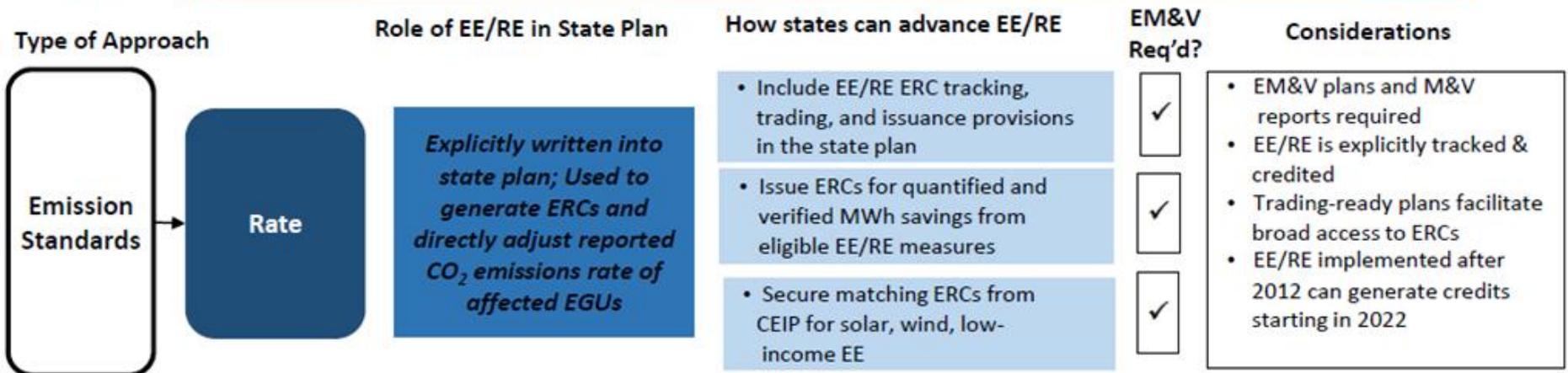
Mass-based emission standards approach



- Any EE/RE measure achieving savings or generation during the plan performance period, regardless of when it was installed, automatically “counts”
 - It displaces fossil generation and helps meet the CO₂ emission cap
- States have many opportunities to advance EE/RE as a complement to their state plan, through allowance allocation as part of a state plan, and can get matching allowances from EPA through the Clean Energy Incentive Program
- Generally doesn’t require EM&V as part of state plan – stack CO₂ emissions are the key criteria for showing that state goals for affected EGUs have been met.



Rate-based emission standards approach

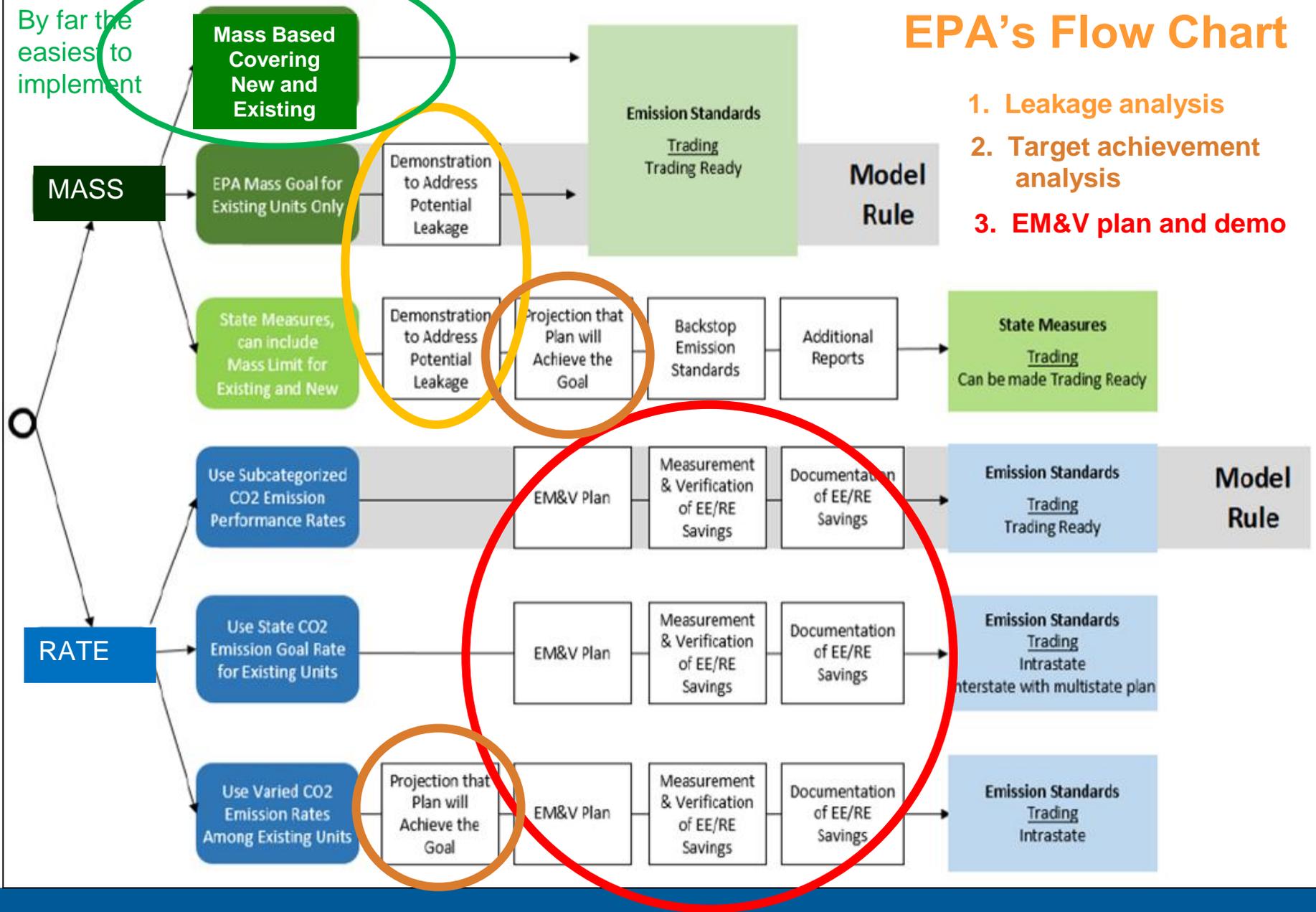


- Quantified and verified MWhs from eligible EE/RE during the plan performance period (2022 and beyond) may be eligible for tradable Emission Rate Credits (ERCs), zero-emission MWh credits that can be used by affected EGUs to lower their reported CO₂ emissions rate during the plan performance period.
 - EE/RE eligible for ERCs includes measures implemented/installed after 2012 that are achieving MWh savings or generation during the compliance period.
 - Must be grid-connected and tied to a state plan.
 - No interstate discounting of EE impacts required.
- ERCs require EM&V for all MWhs; states must include ERC issuance and tracking provisions in state plans.
 - CPP proposed model rule includes presumptively approvable provisions for ERC issuance. Draft EM&V Guidance for EE is also available for comment.
- States that opt into the Clean Energy Incentive Program may award early action ERCs to EE/RE project providers that achieve MWh savings/generation in 2020 and/or 2021.

EPA's Flow Chart

By far the easiest to implement

1. Leakage analysis
2. Target achievement analysis
3. EM&V plan and demo





Incentives for Early Action

- All EE/RE that achieves energy savings or generation during the plan performance period (2022-2030) helps states meet their CPP goals for affected EGUs, either as a formal part of a state's plan or as a complementary effort.
 - Efforts in place today are already working to help states achieve their goals for affected EGUs
- Under a mass-based plan approach, states can reward EE/RE efforts, including for early action, through allowance allocation provisions
- Under a rate-based approach, eligible EE/RE put in place after 2012 that achieves electricity savings or generation during the compliance period may be issued Emission Rate Credits (ERCs).
- The Clean Energy Incentive Program (CEIP) provides additional incentives for solar, wind and low income EE investments in 2020-2021 both rate-based and mass-based approaches.



Clean Energy Incentive Program

- EPA is providing the Clean Energy Incentive Program (CEIP) to incentivize early investments that reduce end-use energy demand in low income communities or that generate wind and solar power during 2020 and 2021
- The CEIP is an optional, “matching fund” program states may choose to use to incentivize early investments in wind or solar power, as well as demand-side energy efficiency measures that are implemented in low-income communities
- EPA will provide matching allowances or Emission Rate Credits (ERCs) to states that participate in the CEIP, up to an amount equal to the equivalent of 300 million short tons of CO₂ emissions nationally. The match is larger for low-income EE projects, targeted at removing historic barriers to deployment of these measures. Also, states with more challenging emission reduction targets will have access to a proportionately larger share of the match
- To be eligible for allowances or ERCs under the CEIP a qualifying RE project must begin construction, and a qualifying EE project must begin operation, following submittal of a final state plan to the EPA that contains requirements for CEIP participation.
- The CEIP will help ensure that momentum to no-carbon energy continues and give states a jumpstart on their compliance programs
- EPA will engage with stakeholders in the coming months to gather feedback on specific elements of the program and finalize implementation details



EM&V Guidance

- **Regulatory provisions for evaluation, measurement and verification (EM&V)** are included in both the final emission guidelines and proposed rate-based model trading rule
 - The *final emission guidelines* include the basic requirement to conduct EM&V under certain state-plan circumstances
 - Additional EM&V provisions are *proposed in the model trading rule* to support issuance of emission rate credits (ERCs)
- EPA also released draft **EM&V guidance for EE** that supports implementation of the final guidelines and proposed rate-based model rule
 - The purpose is to provide supplemental information to help states and EE providers successfully quantify and verify savings
 - Not a regulatory document
 - Your input on the draft guidance is needed

Topics Covered in EM&V Guidance

EM&V Methods	Avoiding double counting
Electricity savings metrics and baselines	Persistence of savings
Reporting timeframes and considerations	Savings quantification/ verification cycles
Deemed savings	T&D savings adders
Independent factors	Interactive effects
Accuracy and reliability	Protocols and Guidelines



EE-related Opportunities for Comment

- Under the federal plan and model rule proposal, there are several areas related to EE/RE where EPA is seeking comment
 - Clean Energy Incentive Program (e.g. Definition of an EE project that benefits a low income community, size of the matching reserve for RE and for low-income EE, method to convert MWh to CO₂ emission allowance equivalents under a mass approach, etc)
 - Proposed Federal Plan (e.g. Eligibility of RE and EE for ERC issuance under a rate-based federal plan; set-asides under a mass-based federal plan)
 - Proposed Model Rule (e.g. Eligibility and Provisions for EE/RE ERC issuance under the rate-based model rule; set-asides under a mass-based model rule approach, EM&V provisions)
 - Draft EM&V Guidance: <http://www2.epa.gov/cleanpowerplanttoolbox>
- For more information on the federal plan and model rule proposal, see <http://www2.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants#federal-plan>
- A Factsheet is available at: <http://www.epa.gov/airquality/cpp/fs-cpp-proposed-federal-plan.pdf>
- You have 90 days to comment, following publication of the proposed federal plan and model trading rules in the Federal Register
- We expect that the model rule will be finalized by Summer 2016

Thank You for Your Time and Attention

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts focused on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies

to:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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The Regulatory Assistance Project

Beijing, China • Berlin, Germany • Brussels, Belgium • Montpelier, Vermont USA • New Delhi, India

www.raponline.org



Questions?



Feedback & Information

- Feedback to CEO
 - Blank cards at your tables are for questions that could not be addressed due to time and/or comments for consideration (CEO staff will collect)
 - ColoradoEnergyOffice@state.co.us
Please use the subject line: “EE in CPP”
 - Questions and comments will be aggregated in a shared document to be posted online
- CDPHE website: www.colorado.gov/cdphe/CleanPowerPlan
 - o Sign up for email notifications
 - o Formal public comments: cdphe.commentsapcd@state.co.us
 - o Find information on Colorado’s public meetings, shared documents, and more
- EPA website: www2.epa.gov/cleanpowerplan
 - o Find federal rules, technical support documents, tools and more