



Colorado  
Energy Office

# Envisioning Statewide Energy Efficiency

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# Colorado's Energy Economy

## Mission:

**Innovative  
Production**

**Efficient  
Consumption**

**All Resources**

**All Economic Sectors**

## Vision:

**Economic  
Prosperity**

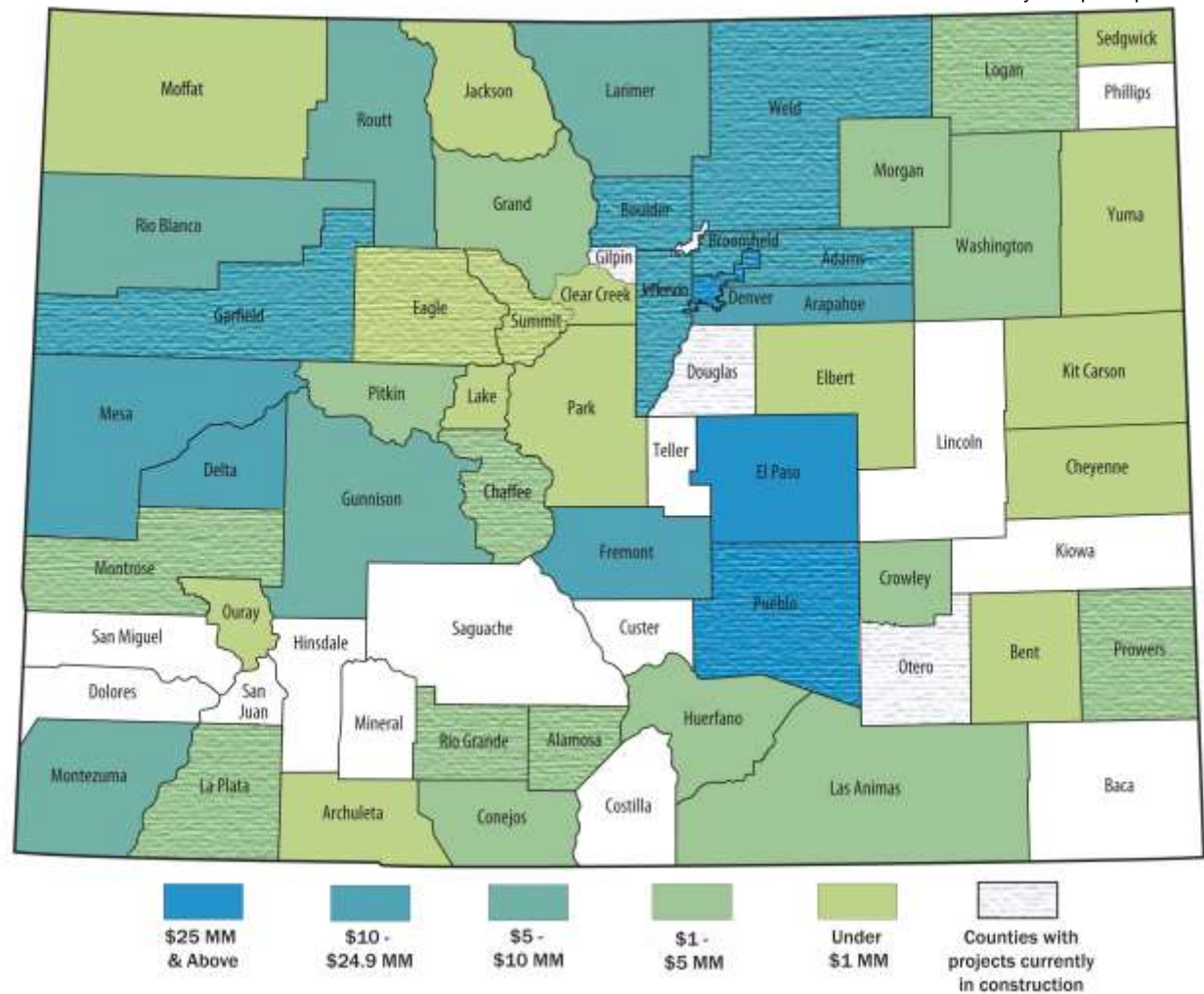
**Healthier  
Citizens**

**Healthier  
Environment**

# Energy Performance Contracting (EPC)

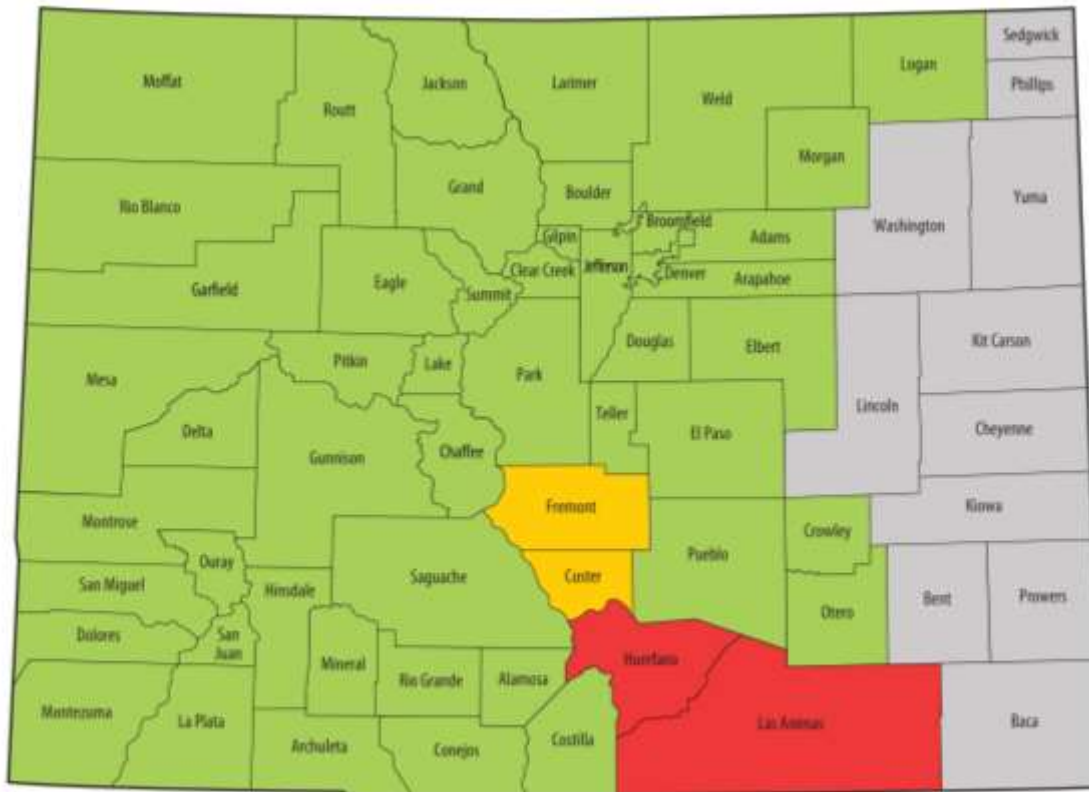
- Since 2000:  
**154** projects completed  
**\$328,520,844** in energy & water efficiency upgrades.
- Underway: **23** projects;  
**\$83,277,169** in upgrades.
- 19 additional projects being developed.
- \$1 in construction for every \$0.02 CEO spends
- Private sector pilot:
  - 12 projects in development

\*white areas have yet to participate.



# Residential Energy Efficiency

## Green MLS Adoption



97% of the homes in Colorado covered by a Green MLS\*

\*Vail MLS (Eagle County) have adopted Green Fields but not fully operational.

Royal Gorge (Fremont, Custer) has basic concept in place but needs additional fields

First Phase of Green MLS Initiative is considered complete

# Energy Efficiency Financing Tools

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## Residential: Loan Options

1. Low interest unsecured loan for reactionary or smaller retrofits (>10k).
2. Low interest secured loan for deeper retrofits.
3. Energy Saving Mortgage Incentive (can be used with any mortgage product).

## Commercial: Address Project Cost/Capital Acquisition Limits

1. Promote current low interest unsecured loan product (Elevations C.U.)
2. Develop a Commercial PACE program (SB13-212).
3. Bring renewable energy into the Energy Performance Contracting conversation.

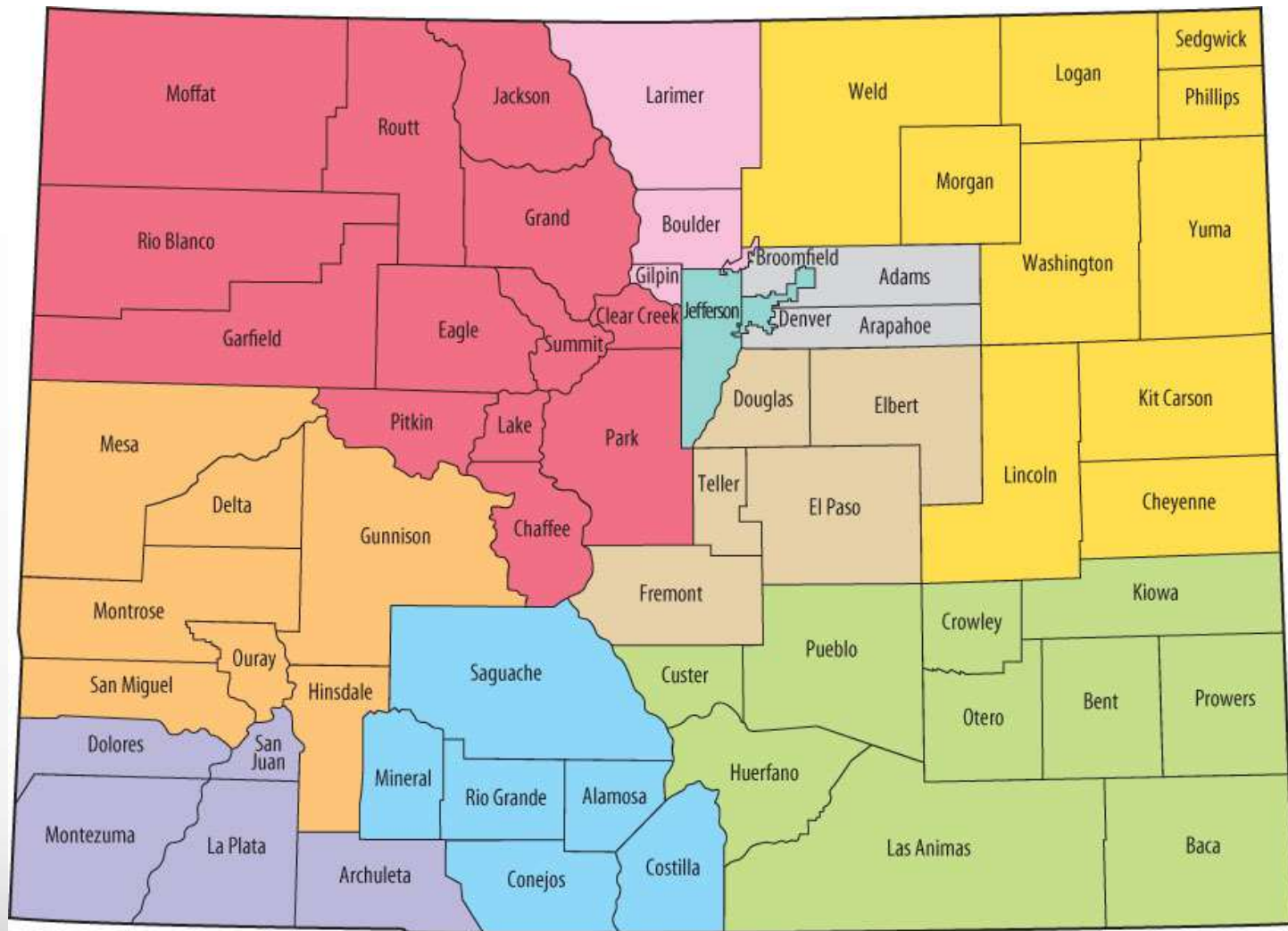
# Weatherization – Income Eligible EE

## Residential Energy Efficiency Services:

Health/Safety  
Air Leakage Reduction  
Duct Sealing  
Heating System Repair/Replacement  
Shell Insulation  
Light Bulb Conversion  
Refrigerator Replacement

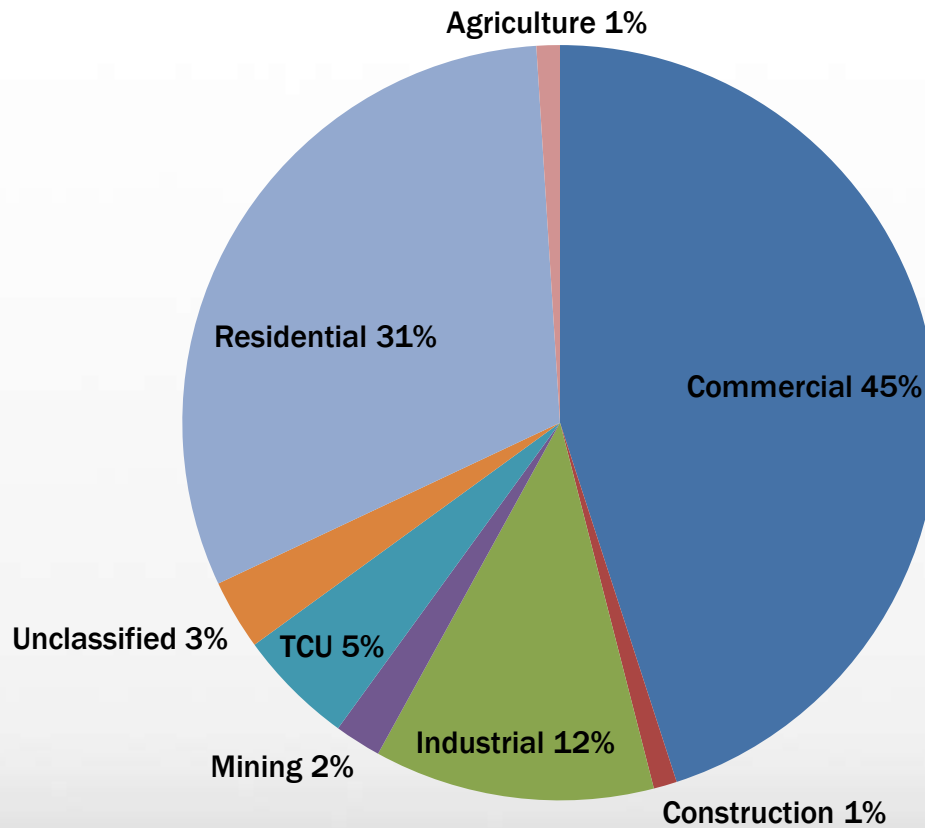
2012-13: 2,389 homes  
440,000 annual therms saved  
1,805,000 annual kWh saved  
\$200+/home/yr. income

# Weatherization Regions



# Colorado Electricity End Use

## 2008 Electricity End Use Breakdown - Xcel Energy Colorado Service Territory

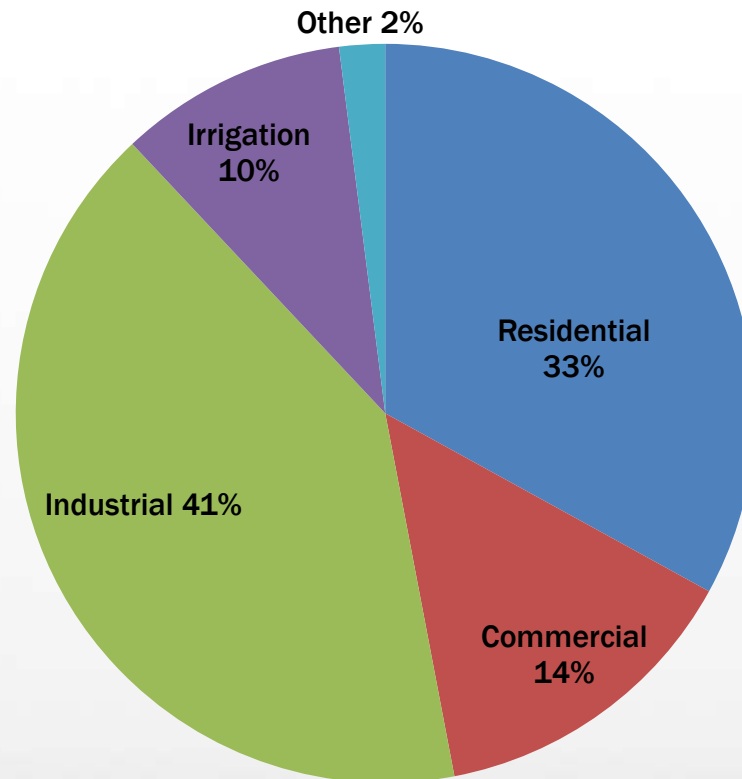


Source: Colorado DSM Market Potential Assessment (KEMA)



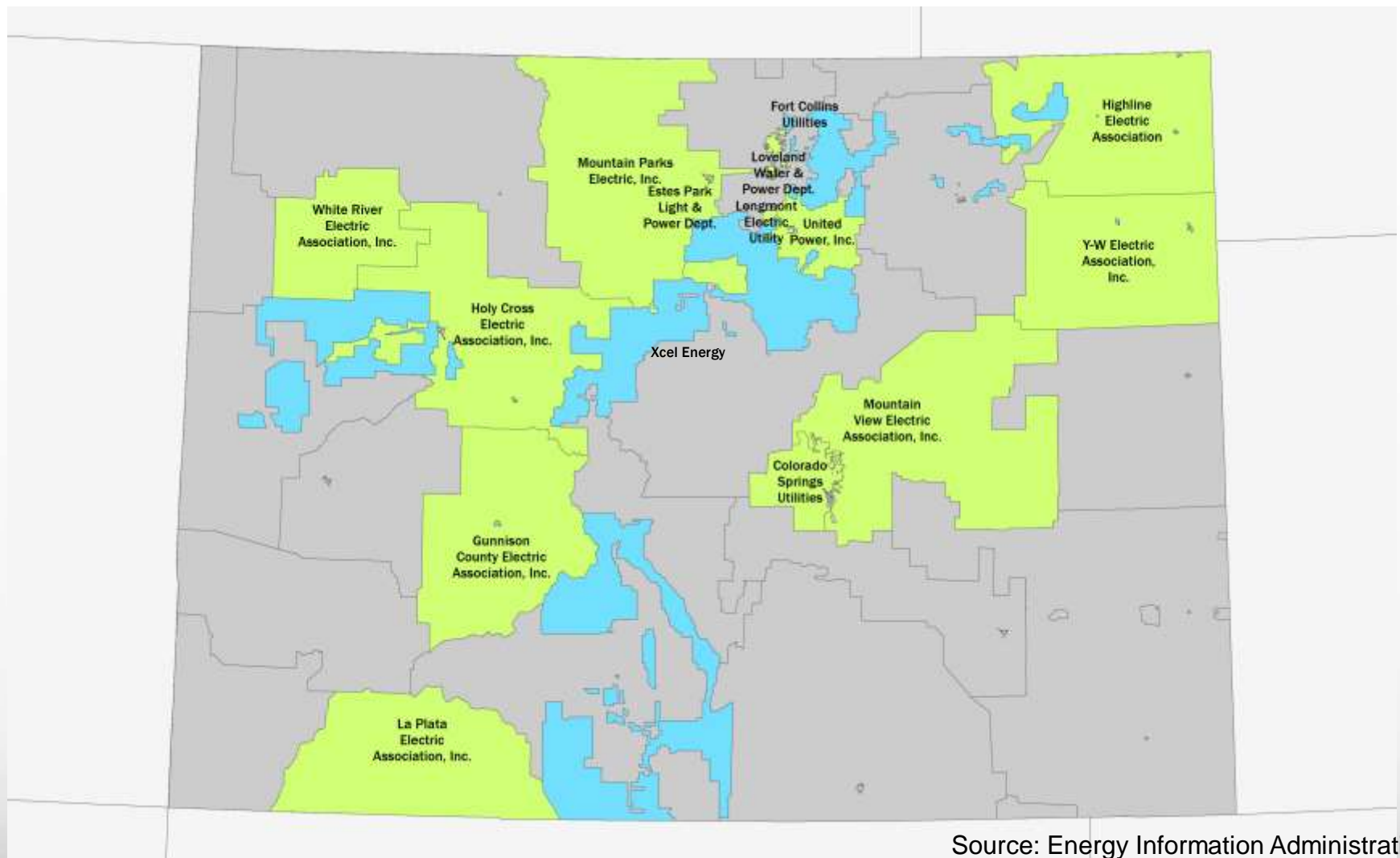
# Colorado Electricity End Use

## Tri-State 2008 Electricity Sales by Sector



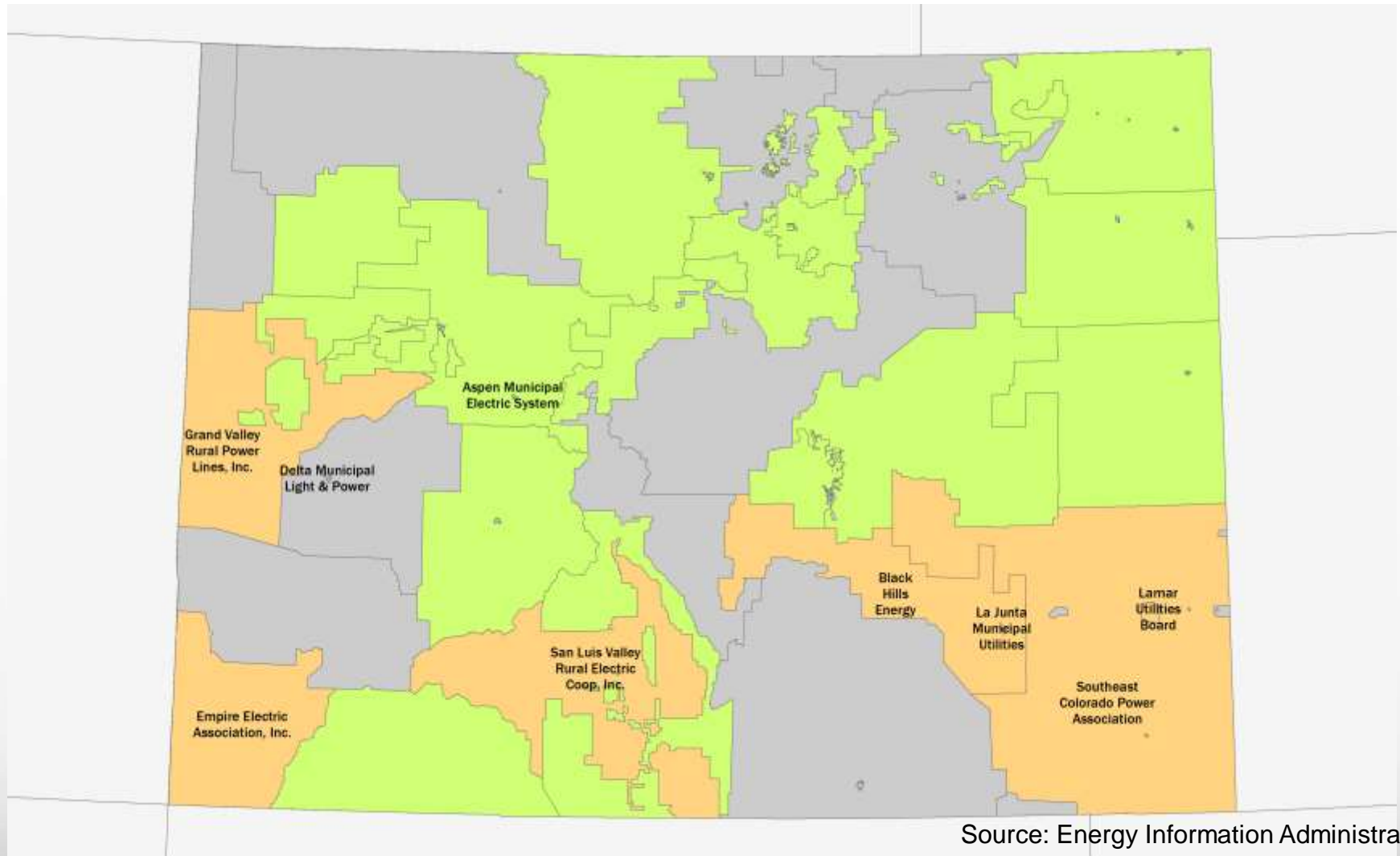
Source: System Wide Electric Energy Efficiency Potential Study – Volume I (Nexant)

# Colorado DSM Programs – 2004

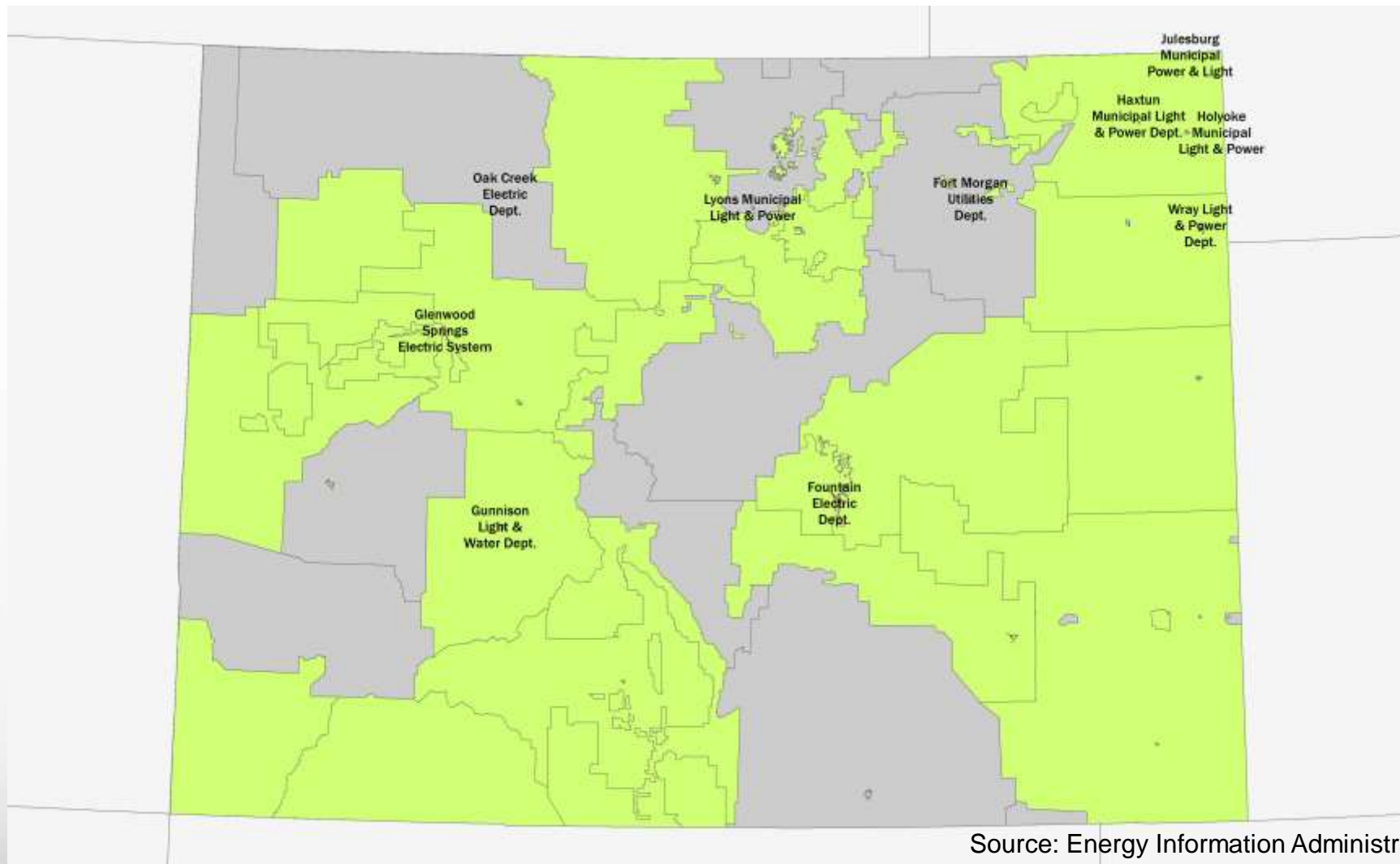


Source: Energy Information Administration

# Colorado DSM Programs – 2007

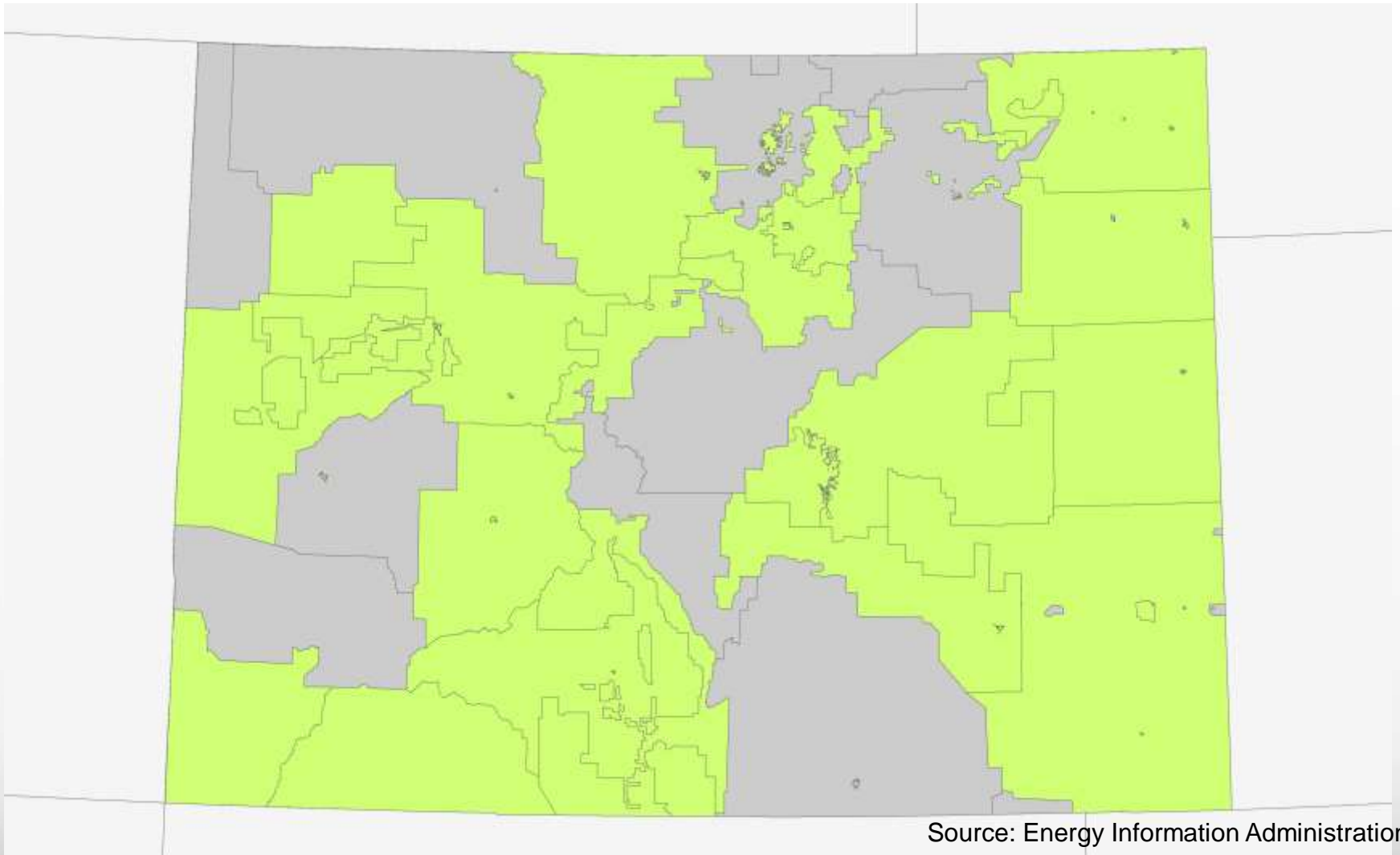


# Colorado DSM Programs – 2010



# Colorado DSM Programs – 2013

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Source: Energy Information Administration

# Total Spent on DSM by State

State	Electric DSM Program Spending/Budgets (million \$ per year)						
	2002	2004	2006	2008	2010	2012	2013 (est.)
AZ	4	4	19	45	94	120	140
CO	11	21	18	28	66	97	105
NV	3	11	30	55	46	37	50
NM	1	1	1	10	24	27	35
UT	9	16	27	36	51	46	51
WY	~0	~0	~0	~0	3	4	5
<b>Region</b>	<b>29</b>	<b>54</b>	<b>95</b>	<b>174</b>	<b>284</b>	<b>331</b>	<b>386</b>

Source: SWEEP

Total DSM Electricity Savings	2007	2008	2009	2010	2011	2012
Total MWh Saved	952,751	1,209,227	1,802,446	1,711,823	1,764,040	2,506,442
Total MW Saved	317	398	525	594.7	667	762

Source: Energy Information Association

# Envisioning Statewide Energy Efficiency

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## Development Steps/Criteria:

Understanding end uses

Identifying/prioritizing opportunities

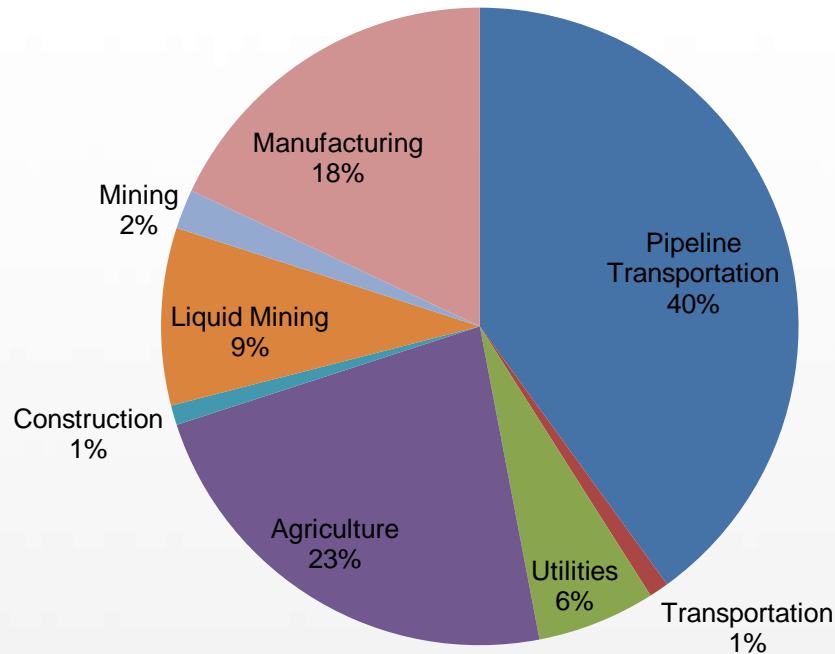
Existing programs, resources and partners

Market needs, barriers, opportunities

Draft potential strategies; solicit input & partners

# Overview – Developing an EE/DSM Program

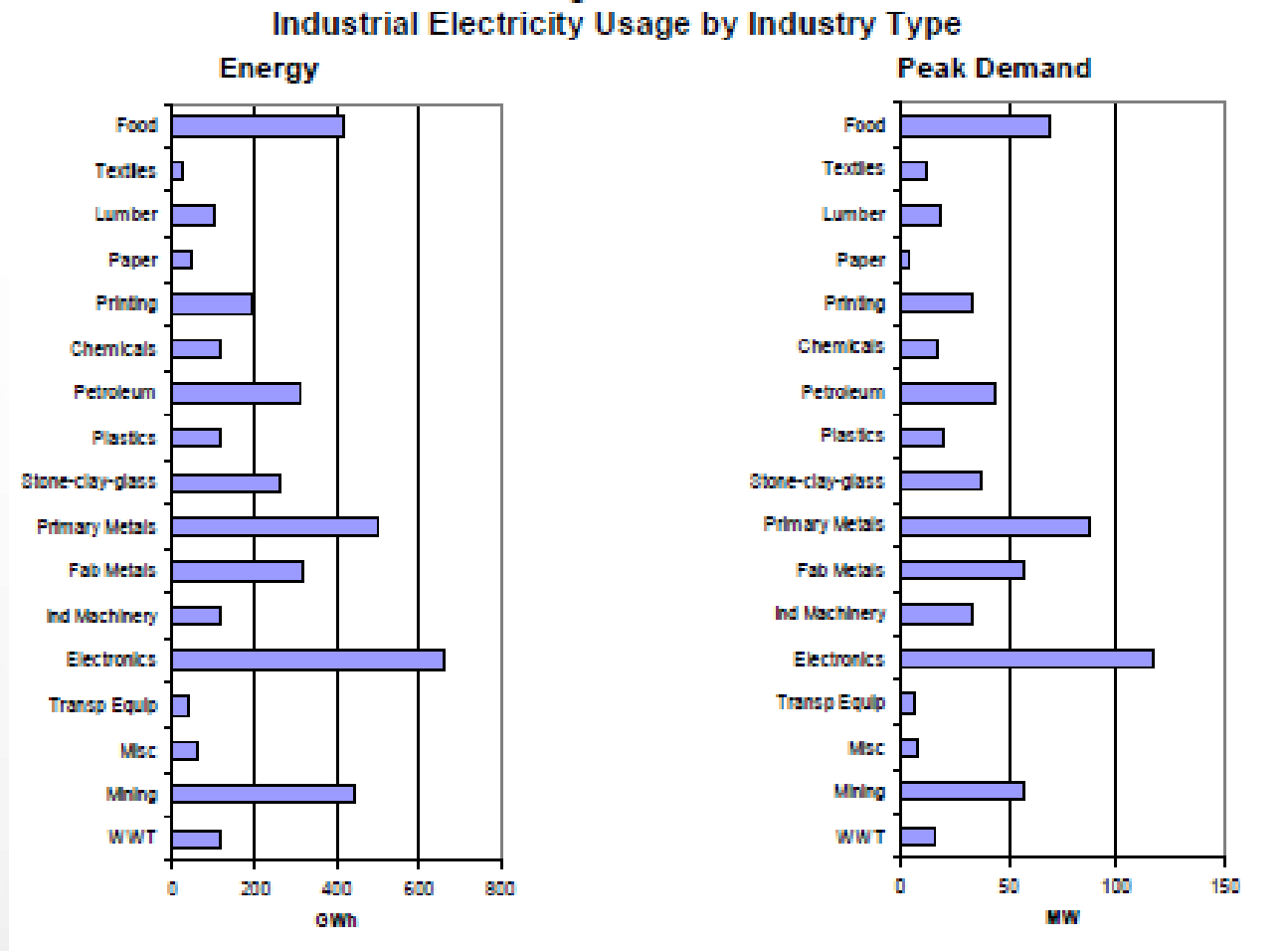
## Tri-State Industrial Energy Consumption by Sector



Source: System Wide Electric Energy Efficiency Potential Study – Volume I (Nexant)



# Overview – Developing an EE/DSM Program



Source: Colorado DSM Market Potential Assessment (KEMA)

# Understanding End-Use Energy Utilization, by Segment

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- In 2010, Colorado's **industrial energy** consumed was responsible for **29.5%** of the state's energy consumption(BCS).
- **Energy expenses** account for about **7%** of the **agriculture** sector's **operating** expenses or about \$400 million annually (BCS).
- Irrigation: smallest major end use sector in Tri-State's service territory (10%)
  - Eastern Colorado it comprises 45% of the total load
  - July and August: 20% of the *total* daily load across the system (Nexant).
  - In 2008, powered irrigation was responsible for 53% of the Colorado agriculture sector's electric expenses for a total cost of \$73.3 million (BCS).
- Dairy efficiency:
  - 130-160 dairies producing milk in the state
  - Primarily Weld, Morgan, and Larimer counties (more than 80%)
  - Operating 24/7 (BCS).

# Overview – Developing an EE/DSM Program

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## Existing Resources



- Utility DSM resources: Xcel, Tri-State, and numerous municipal utilities
  - Under Tri-State 62% of coops pass on 95% of the rebates
  - Most popular are CFLs, high efficiency water heaters, and Energy Star refrigerators
- CSU Extension:
  - irrigation audits
  - a range of financial resources
  - CSU Department of Soil and Crop Sciences- irrigation scheduling tool (water & energy savings potential)
- USDA's Rural Energy for America Program (REAP) offers grants and loans to producers

# Overview – Developing an EE/DSM Program

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## Existing Resources (cont'd)

- USDA Natural Resources Conservation Service's (NRCS) Environmental Quality Incentives Program (EQIP):
  - partial funding to complete ag energy management plans (AgEMPs)
  - implementation of EE/RE projects
  - *Conservation Innovation Grants*: innovative conservation approaches and technologies.
- Colorado Department of Agriculture's Advancing Colorado's Renewable Energy (ACRE) grants provide funding to promote energy-related projects beneficial to Colorado's agriculture industry.
- Numerous local organizations, trade associations
- *What other resources are available?*

# Overview – Developing an EE/DSM Program

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## Current Market Barriers

- Cost – First costs and project payback were identified as the top barrier for implementing EE in agricultural and industrial sectors
- Limited penetration/Future expansion of DSM – according to Nexant’s Tri-State study 46% of coops will likely limit development of new programs due to:
  - Customer applicability and perceived market potential.
  - Lack of developed trade ally network.
  - Cooperative willingness based on business model.
  - Required In-house and Tri-State technical expertise.
- Technical support – lack of support/expertise identified as a major barrier in agriculture and industrial studies

# Overview – Developing an EE/DSM Program

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## Current Market Barriers (cont'd)

- Refit cycle – producers often unwilling to proactively replace equipment
- Lack of awareness/uptake
  - USDA grants and financing are not well used –cumbersome process, paper intensive, feasibility studies required for some grants
  - CSU Extension's discounted audits have had little uptake; 2 staff are stretched thin
- Overall coordination of existing resources
- *Are there other barriers not listed above?*

# Overview – Developing an EE/DSM Program

## Preliminary Determination of Potential

- Moderate incentive scenario (50% of incremental cost):
  - estimated potential savings of 3.3 GWh in 2010
  - grow to annual savings of 5.8 GWh in 2015
  - represents 0.3% and 0.5% of the total irrigation annual sales respectively (Nexant).
- Summer peak reduction: 0.8 MW in 2010; 1.4 MW in 2015 (Nexant).
- A 10% reduction in irrigation electricity use = 90 million kWh (BCS).
- Dairies can reduce electricity use 10-35% depending on state of equipment installed, or \$520,000-\$1.82 million annually in Colorado (BCS).
- *Our preliminary conclusion is that irrigation and dairies offer the best opportunity to increase energy efficiency in the agricultural sector.*

# Overview – Developing an EE/DSM Program

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## Potential Measures



- Irrigation efficiency
  - Pumps and motors, VFDs, improved maintenance, and more efficient irrigation practices
  - Improved maintenance: on average irrigation pumps operate at 45% efficiency (up to 77% efficiency can be achieved through regular testing and maintenance – CSU Extension).
- Dairy
  - Lighting, process, heating and cooling, pumps and motors
- *Are there other areas/measures not listed above?*



# Overview – Developing an EE/DSM Program

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## Potential Strategies

- Coordination of various resources
- Marketing/Driving demand
- Technical support
  - Audits and audit review
  - Project and contractor selection
  - Grant writing
  - Navigation of various resources (i.e. concierge approach)
- DSM program development, support
- **What's missing? What's most/least likely to be successful?**

# Overview – Developing an EE/DSM Program

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## Partners



- Utilities
  - Xcel, Tri-State, CREA, Coops, etc
- Colorado Department of Agriculture
- USDA
- CSU Extension
- Trade Associations
  - Rocky Mountain Farmers Union
  - Corn Growers Association
  - Dairy Association
  - Others
- *Who else should be part of this initiative?*

# In Summary

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- Motivation
- Opportunity
- Means

**To solve this mystery, CEO is seeking your input/assistance.**

# Contact Us

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The Colorado Energy Office



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