MINING’S CRITICAL ROLE IN INFRASTRUCTURE, ENERGY AND THE ENVIRONMENT

A Colorado Perspective – The Road Ahead

STUART A. SANDERSON, PRESIDENT
WWW.COLORADOMINING.ORG
The Colorado Mining Association

• Founded 1876, incorporated 1897
• 900 members include producers of coal, metals, agricultural and industrial minerals
• More than 180 companies, including vendors, service providers and manufacturers
Mining in Colorado

• Accounts for 73,450 Jobs
• $8.8 Billion to CO Gross Domestic Product (GDP)
• Top US Gold Producer Acquires State’s Top Gold Mine
• CO now ranks 32\textsuperscript{nd} among states in Fraser Institute Survey
COLORADO – INTERNATIONAL MINING CENTER

- Colorado School of Mines – founded 1874
- Denver – infrastructure of expertise
- Headquarters to hundreds of companies
Mining Colorado’s Heritage and its Future – Colorado Ranks
Molybdenum

• Added to stainless and alloy steels for anticorrosive and strength qualities
• It is used in many of the products used in households and industry:
  – Refines and removes sulfur from petroleum products
  – Used in Automobiles, motorcycles, bicycles, industrial, lab, and hospital equipment and parts
  – Heat sinks, computers
  – Toothpaste, WD-40, light bulbs, cooking utensils, paint, and so much more.

COLORADO RANKS 1ST!

Mining Matters… when you drive a vehicle.
Thin Film Applications

Photovoltaics (Solar Cells)

Flat Panel Displays
Henderson and Climax Mine Complexes
Is this font/shadow intentional? Does not match other headers and it's making my eyes cross.
Bob Burnham, 12/2/2015
Climax Mine

Located 13 miles north of Leadville, Colorado at 11,318 foot Fremont Pass
Reduced Molybdenum (MO) Production at Henderson Mine in 2016

• Company Announced Decision to reduce production by more than 40% in 2016
• Demand for metals and prices have declined
• Slowing economic growth in China and reduced imports have also affected the price of metals generally
• Low MO price leads to declining production
Gold

• Used in a variety of products and industries including:
  – Currency and Jewelry, Currency & Jewelry
  – Medicine and dentistry
  – Cell phones, MP3 players, and automobile airbag control panels

*Colorado ranks 4th*

*Mining Matters... when you work on a computer.*
Cripple Creek & Victor Gold Mine
State’s Most Productive Gold Mine
Now Owned by Top U. S. Gold Producer

Pikes Peak
EL. 4,302 m / 14,110 ft

Colorado Springs
EL. 1,839 m / 6,035 ft

Cripple Creek
EL. 2,894 m / 9,494 ft

Victor
EL. 2,959 m / 9,708 ft

EL. 3,078 m / 10,100 ft
Energy Minerals

Coal

- Colorado ranks 10th in coal production
- Clean coal is used to produce 60% of Colorado’s electricity
- High Energy Content – low sulfur fuel of choice throughout the world
- Mine workers – average wages and benefits $122,000
- Mining operations anchor rural economies
- Mines pay hundreds of millions in taxes
- Colorado coal mines paid $40 million in federal/state royalties 2014
- Colorado ranks 4th among the states in royalty payments

COLORADO RANKS 11TH AMONG U. S. STATES

Mining Matters… when you plug in for power.
In royalties paid?
Bob Burnham, 12/2/2015
“Green States” Pay Considerably Lower Rates for Electricity

Key Competitive Advantage
Low-Cost Electricity from Coal

<table>
<thead>
<tr>
<th>Region</th>
<th>Average Rate (cents/kWh)</th>
<th>Coal Percentage</th>
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</thead>
<tbody>
<tr>
<td>Coal-Dependent</td>
<td>9.1</td>
<td>48%</td>
</tr>
<tr>
<td>Northeast</td>
<td>14.8</td>
<td>4%</td>
</tr>
<tr>
<td>California</td>
<td>14.6</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

U.S. EIA, 2013 data (March 2014). Average retail electricity prices per kWh. Weighted average of CA and NE states equals 14.7 cents per kWh.
U.S. Coal Fuels 40% of Electricity Generation in the U.S.

- Coal remains lowest-cost major fuel for electricity generation.

Source: Peabody Global Analytics and EIA. 2014 compared to April 2012.
World Wide Coal Production

Source: EIA, World Coal Assn.
Coal? Should this be China?
Bob Burnham, 12/2/2015
Coal: The World’s Fastest Growing Major Fuel

- Coal projected to fuel largest percentage of global electricity generation growth
- Coal grew dramatically faster than all other major fuels in past decade
- IEA and other observers project that coal will overtake oil as world’s largest energy source in coming years

**Expected Electricity Growth (2011 – 2035)**

- Coal
- Natural Gas
- Other
- Hydro
- Nuclear

Forces Impacting Coal

- House Bill 10-1365 passed five years ago will result in premature retirement or conversion to higher cost energy sources = 1,000 MW
- Will ultimately cause Colorado production losses of about 4 million tons annually
- EPA Mercury and Clean Power Plan regulations will result in additional plant retirements nationwide
- Lawsuits and “closed door” settlements negotiated with anti-coal groups has caused Tennessee Valley Authority plant closures, further limiting export markets on which Colorado coal producers rely
- Lower gas prices only part of the story
The Cost of the Clean Power Plan Dwarfs Other EPA Rules

IMPACT ON COLORADO COAL PRODUCTION
Direct Link to EPA Regs, State Policies to Reduce Coal Use or Mandate Higher Cost Energy

Total Coal Produced Per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Tons Per Million</th>
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<tbody>
<tr>
<td>2004</td>
<td>39.7</td>
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<tr>
<td>2005</td>
<td>37.8</td>
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<td>2010</td>
<td>25</td>
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<td>2011</td>
<td>26.8</td>
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<td>2012</td>
<td>29.5</td>
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<tr>
<td>2013</td>
<td>24</td>
</tr>
<tr>
<td>2014</td>
<td>24</td>
</tr>
</tbody>
</table>

Revised Figures slight increase from estimates CO ranks 10th
Nahcolite – Pure Sodium Bicarbonate

• Colorado has only significant pure sodium bicarbonate reserves in U. S.
• Used in animal feed, flue gas desulfurization – lowering power plant emissions
• Other uses, baking soda and toothpaste
• Outlook improving

*Mined in Colorado!*
Secondary Processing Line will increase manufacturing capability by 250,000 tons annually.
Limestone

- Used as aggregate, and in cement and other building materials
- Used in industrial air filters to remove sulfur from exhaust gases
- Used in paint, paper, glass, plastic, and carpet production
- Used in water treatment and filtration
- Used in the construction of pads for wind towers

Mined in Colorado!

Mining Matters… when you rollerblade on a sidewalk.
Gypsum

- Primarily used in wallboard and plaster products
- Also used to make Portland cement
- Used in small amounts in agricultural applications
- Pure gypsum is used in glass-making
- Demand increasing with recovery in housing market

Mined in Colorado!

Mining Matters... when you build a house.
118th National Western Mining Conference & Exhibition
– March 21-24, 2016
Colorado Convention Center