CO ENERGY IMPACTS: PRODUCTION, JOBS, REVENUES & FORECASTS

Chris Akers
State Demography Office
Energy & Environment Symposium
April 17, 2019
OVERVIEW

• RECORD Colorado Oil & Gas Production
• Employment Changes
• Price & Production Forecasts
• State Revenue Projections
Larimer County Oil Production from 2010 to 2018

3,342,800 barrel increase or 492% from 2017 to 2018

Annual Barrels of Oil Produced

Source: http://cogcc.state.co.us/COGCCReports/production
Adams County Oil Production from 2010 to 2018

2,821,663 barrel increase or 356% from 2017 to 2018

Source: http://cogcc.state.co.us/COGCCReports/production
Arapahoe County Oil Production from 2010 to 2018

Annual Barrels of Oil Produced

2,259,200 increase from 2010 (3872%)

1,314,700 increase in 2018 (131%)

Source: http://cogcc.state.co.us/COGCCReports/production
Four Colorado Counties that produced more oil in the last month of 2018 than in all 12 months of 2007.
NATURAL GAS PRODUCTION 2000 TO 2018

Colorado Natural Gas Production

Source: http://cogcc.state.co.us/COGCCReports/production
NATURAL GAS PRODUCTION SHIFT

Largest Natural Gas Producing Counties in CO, 2011-18

Source: http://cogcc.state.co.us/COGCCReports/production.aspx
### CO's Top 6 Natural Gas Producing Counties in 2018

<table>
<thead>
<tr>
<th>County</th>
<th>Natural Gas Production (Million MCF)</th>
<th>Share of Statewide Production</th>
<th>% Change in Production from 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weld</td>
<td>807.5</td>
<td>43%</td>
<td>18%</td>
</tr>
<tr>
<td>Garfield</td>
<td>494.1</td>
<td>27%</td>
<td>8%</td>
</tr>
<tr>
<td>La Plata</td>
<td>294.4</td>
<td>16%</td>
<td>1%</td>
</tr>
<tr>
<td>Mesa</td>
<td>61.7</td>
<td>3%</td>
<td>48%</td>
</tr>
<tr>
<td>Rio Blanco</td>
<td>51.6</td>
<td>3%</td>
<td>-13%</td>
</tr>
<tr>
<td>Las Animas</td>
<td>51.0</td>
<td>3%</td>
<td>-19%</td>
</tr>
<tr>
<td>Balance of CO</td>
<td>101.7</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>(31 Counties)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
COLORADO OIL & GAS EMPLOYMENT 2007 – 18

Source: Colorado Dept. of Labor & Employment (CDLE / QCEW)
Mining Employment Rebounding, but not evenly across Colorado Counties

• 9,500 Mining Jobs lost from 2014 to 2016
  • Dampened Overall Job Growth - only 2.4% in ’16 & caused weakness in Wages - only +1.0%

• +2,300 Mining Jobs in 2017 (12% growth)

• 3rd Quarter Growth of 8% from Q3_2017 (1,800 jobs)

Source: CDLE / QCEW & CES
Weld +2,200
Denver +1,020
Arapahoe +202
Mesa +89
Morgan +83
Garfield +40
Colorado 10 Year Change in Mining Employment
Q3 2008 to Q3 2018

Employment Change
- Loss: > 500 Jobs
- Loss: 100 to 500 Jobs
- Loss: 0 to 100 Jobs
- Gain: 0 to 100 Jobs
- Gain: 100 to 500 Jobs
- Gain: > 500 Jobs
- No Data

Garfield -1,720
Mesa - 1,550
Rio Blanco -511
Weld +5,350
Denver +1,330

Source: Quarterly Census of Employment & Wages, Colorado State Demography Office
04/12/2019
PRICE, PRODUCTION & REVENUE FORECASTS
Colorado Oil Production and WTI $/bbl 2014-18 Actual, 2019 Forecast

CO Oil Production (in Millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil Produced (in Millions)</th>
<th>WTI $/bbl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>96</td>
<td>$93</td>
</tr>
<tr>
<td>2015</td>
<td>123</td>
<td>$49</td>
</tr>
<tr>
<td>2016</td>
<td>118</td>
<td>$43</td>
</tr>
<tr>
<td>2017</td>
<td>133</td>
<td>$51</td>
</tr>
<tr>
<td>2018</td>
<td>177</td>
<td>$65</td>
</tr>
<tr>
<td>2019</td>
<td>192</td>
<td>$59</td>
</tr>
</tbody>
</table>

Source: EIA, Moody’s Analytics & SDO Forecast
FEDERAL RESERVE 10J ENERGY SURVEY Q1_2019

$/Barrel Oil (WTI)

Survey average

Profitable Price
Price expected in 6 months
Price expected in 1 year
Price expected in 2 years
Price expected in 5 years

$52  $60  $61  $65  $72

https://www.kansascityfed.org/research/indicatorsdata/energy
Colorado Natural Gas Production & NYMEX Natural Gas $/MMBtu 2011 to 2018 actual, 2019 forecast

Natural Gas Produced

NYMEX Natural Gas $/MMBtu

Source: COGCC, Moody’s Analytics & SDO Forecast
STATE SEVERANCE TAX FORMULA

State Oil and Gas Severance Tax Revenue =
Production Quantity - Small Well Exemptions Quantity
- Govt Owned production
X Oil or Gas Price
- Processing and Manufacturing (TPM) costs
X Tax Rate
- Property Tax Credit (Ad Valorem)
Assessed Value from Oil and Natural Gas Production in Colorado

$ in Billions


$7.2 $7.7 $11.9 $6.3 $8.6 $9.7 $8.8 $11.1 $13.3 $8.2 $7.5 $10.2 $14.1

Source: Colorado Department of Local Affairs Division of Property Taxation

Governor's Office of State Planning and Budgeting
State Federal Mineral Leasing Revenue

Source: OSPB March 2019 Forecast

Forecast
State Severance Tax Revenue

Source: OSPB March 2019 Forecast
Thank you!

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https://demography.dola.colorado.gov/
WTI Oil Price Forecast

West Texas Intermediate (WTI) crude oil price and NYMEX confidence intervals dollars per barrel

Note: Confidence interval derived from options market information for the five trading days ending Apr 4, 2019. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Source: Short-Term Energy Outlook, April 2019, and CME Group

https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf
Natural Gas Price Forecast

Henry Hub natural gas price and NYMEX confidence intervals

$\text{Henry Hub spot price}$

Note: Confidence interval derived from options market information for the five trading days ending Apr 4, 2019. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Source: Short-Term Energy Outlook, April 2019, and CME Group
Henry Hub natural gas price

Note: Confidence interval derived from options market information for the 5 trading days ending Mar 1, 2018. Intervals not calculated for months with sparse trading in near-the-money options contracts.
Source: Short-Term Energy Outlook, March 2018, and CME Group.
FEDERAL RESERVE 10J ENERGY SURVEY Q4_2018

Natural Gas (Henry Hub) $/Million Btu

Survey ranges in orange

- Substantial Increase Price: $3.48
- Price expected in 6 months: $3.06
- Price expected in 1 year: $3.12
- Price expected in 2 years: $3.23
- Price expected in 5 years: $3.54

https://www.kansascityfed.org/research/indicatorsdata/energy
CO Dry Gas Production & Henry Hub $/MMBtu 2010-17 Actual, 2018-20 Forecast

Will be deleted, just for reference to show under forecast of natural gas production a year ago and a drop in forecasted price $/MMbut

Source: COGCC, Moody’s Analytics & SDO Forecast
This slide is from the March 2018 forecast – Notice the FY17-18 forecast is $60.1 vs. actual of $143.0 million and depicts difficulty of forecasting Severance Taxes just 1 year out...
EIA forecasts Brent crude oil prices to average $63 per barrel this summer (April-September), $12 per barrel (29 cents per gallon) higher than last summer.
Natural Gas Production 2000 to 2018

Natural Gas Withdrawals U.S. vs. CO

Source: https://www.eia.gov/dnav/ng

U.S. Gas MMcf (LHS)  CO Gas MMCf (RHS)
COLORADO OIL AND GAS 2017 DRILLING PERMITS BY COUNTY

as of 6-1-2017

WELD, 1,043, 67%
GARFIELD, 164, 11%
MESA, 110, 7%
RIO BLANCO, 81, 5%
ADAMS, 54, 3%
JACKSON, 31, 2%
All Others, 82, 5%

Source:
Colorado Mining Sector - Continued Weeks Claimed
(Reflects Week of 19th for Each Month)

February 2019 continued claims are up 7% compared to last year and down 42% compared to February 2017.

Source: Colorado Dept. of Labor & Employment - UIRR
Assessed Value from Oil and Natural Gas Production in Colorado

Source: Colorado Oil and Gas Conservation Commission, Colorado Department of Local Affairs Division of Property Taxation, and OSPB March 2018 Forecast