

INFORMATION SERIES 87

Colorado Mineral and Energy Industry Activities 2023-2024

by Michael K. O'Keeffe



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EXECUTIVE SUMMARY and TAX REVENUE

The Colorado Geological Survey (CGS) estimates the total value of 2023 mineral and energy fuels production in Colorado to be \$20.58 billion, a ~33% decrease from the 2022 estimate of \$30.53 billion mainly due to lower average prices for natural gas. In 2023, the top commodities produced in terms of production value include: oil, natural gas, molybdenum, gold, coal, sand and gravel, cement, crushed rock, and industrial gases (carbon dioxide). Estimated mineral production values for 2023 are shown by commodity type in **Figure ES-1**. Oil and natural gas production accounted for ~84% of Colorado's total mineral and energy production value in 2023. Estimated mineral and energy production values for 1994 through 2023 are shown in **Figure ES-2**.

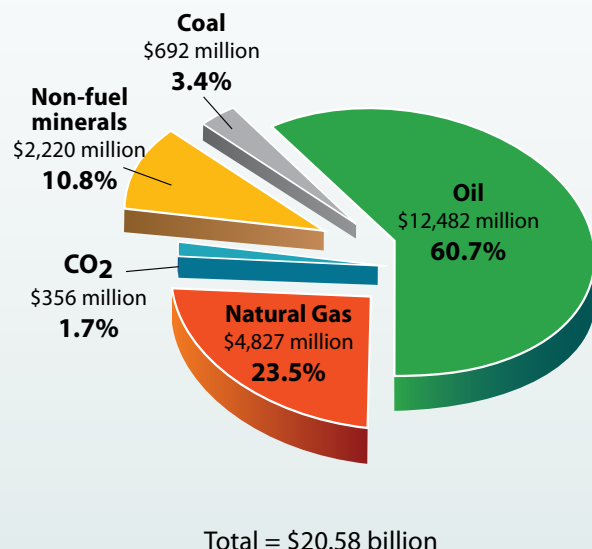


Figure ES-1. 2023 Colorado mineral production value by commodity type (U. S. dollars).

The total value of Colorado oil and natural gas production in 2023 is ~\$17.3 billion which is ~36.9% lower than last year's value of ~\$27.4 billion. Although production remains elevated when compared to historical values, average prices for both oil and gas decreased in 2023. Colorado has the eighth largest proven oil reserves and the ninth largest proven natural gas reserves in the U.S. (EIA, 2024a). The estimated value of Colorado coal production in 2023 is \$692 million which is ~13.7% lower than the 2022 value of ~\$802 million. Coal production and average prices decreased in 2023.

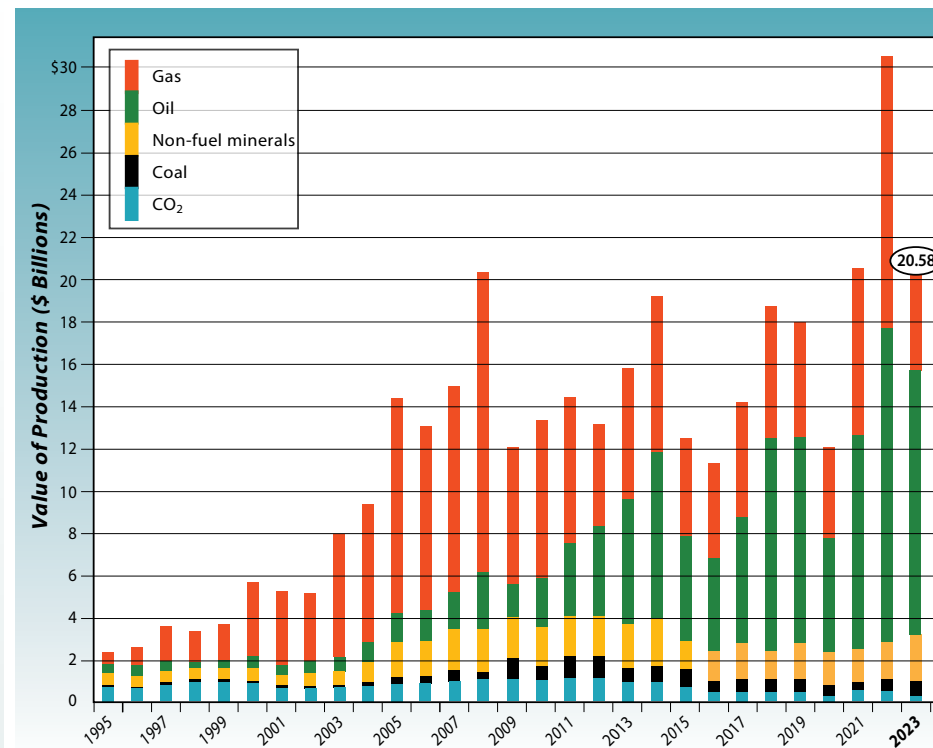


Figure ES-2. Mineral and energy fuel production value in Colorado, 1995–2023.

The overall decreasing trend in coal production over the last several years is due primarily to the increased use of natural gas and renewable energy resources nationwide. In 2023, Colorado is the 10th largest coal producer in the U.S. (EIA, 2024b) with both underground and surface mines currently in operation.

Non-fuel mineral production includes metals (molybdenum and gold), aggregate, limestone, cement, industrial minerals (gypsum, nahcolite), and gases (carbon dioxide, helium). The total estimated value of Colorado's production of non-fuel minerals in 2023 is \$2.22 billion (USGS, 2024a). Colorado is the third largest gold producer in the U.S., behind Nevada and Alaska, based on the total 2023 production from a single mine. Two Colorado mines continue to produce molybdenum, and the state was the second largest domestic producer of this metal in 2023. Although Colorado has been a producer in the past, there was no uranium mine production within the state in 2023.

Carbon dioxide produced in Colorado is used primarily for enhanced oil recovery in the Permian Basin oil fields of Texas and New Mexico. The production value estimate for 2023 is \$356 million. Helium is produced in Cheyenne County and other areas in Colorado, however, production estimates from these facilities are not available.

Severance taxes are state taxes collected on companies who produce nonrenewable resources including oil, gas, coal, molybdenum, and gold. Companies that extract these resources pay severance tax as well as other taxes including income, sales, and property taxes. A portion of the severance tax funds are distributed to counties, municipalities, and school districts. Severance tax funds are also used to support the CGS and other programs within the Colorado Department of Natural Resources (DNR). The distribution hierarchy of total collected state severance tax revenue is shown in **Figure ES-3**. The Colorado Legislative Council Staff provides a summary of severance tax rates, credits by mineral type, and distribution (Colorado General Assembly, 2024).

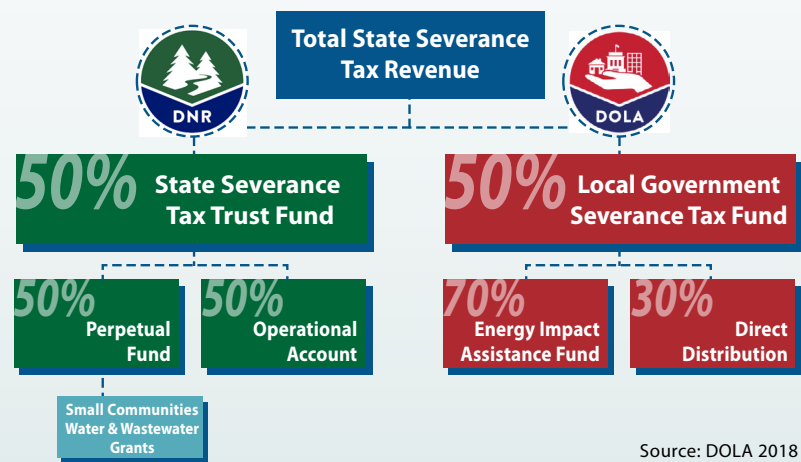


Figure ES-3. Distribution of state severance tax revenue in Colorado.

The Colorado Department of Local Affairs (DOLA) administers the distribution of severance tax revenue to county and local governments. In fiscal year (FY) 2022/2023 (22/23), July 1st through June 30th, Colorado net severance tax collections from metal, coal, and oil/gas producers is ~\$345.96 million (DOLA, 2023). About 98.5% of these tax collections are from oil and gas operations. **Figure ES-4** shows the severance taxes collected by fiscal year since 1994. In FY 23/24, ~\$29.2 million of severance tax was distributed to counties. The map in **Figure ES-5** shows the distribution of severance taxes to each county in FY 23/24.

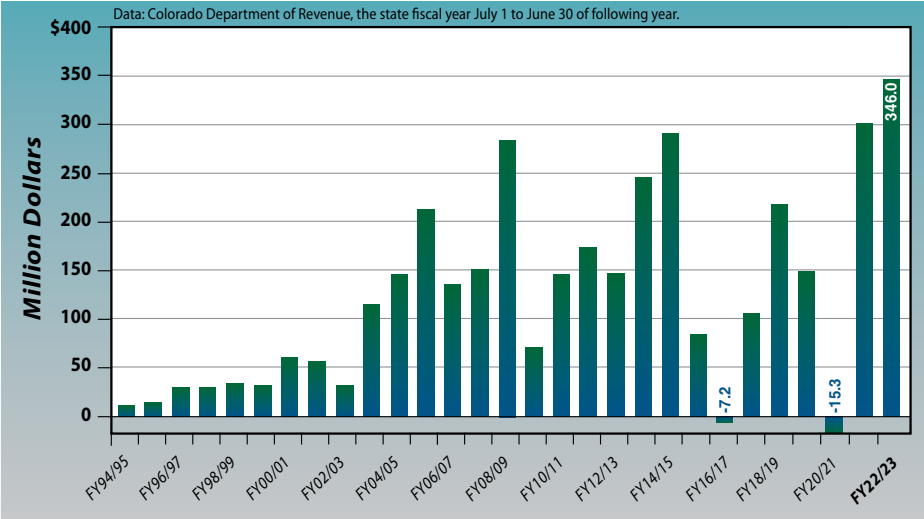


Figure ES-4. Colorado net severance tax collections FY94/95-FY22/23 (NOTE: In FY16/17 and in 20/21, severance refunds exceeded collections, hence the negative value).

The State of Colorado owns ~2.8 million surface acres and ~4 million subsurface (mineral estate) acres of trust lands which are managed and leased by the Colorado State Land Board (SLB) (SLB, 2023a). Revenue generated by the SLB is held in public trusts that provide financial support to Colorado public schools and other public institutions. Trust lands are leased for several purposes that include mining and oil and gas. In FY 23/23, the Colorado state trust assets were valued at \$4.4 billion and SLB assets generated ~\$261.5 million in gross revenue (SLB, 2023a). The SLB provides funds for the Colorado Department of Education’s Building Excellent Schools Today (BEST) program that provides grants for construction of new schools or the renovation of existing facilities. In FY 22/23, the SLB provided \$110 million to the BEST program (SLB, 2023a). Also, the SLB’s financial assets are associated with the Public School Permanent Fund which provides revenue to Colorado public schools. In FY 22/23, the SLB received ~\$215.7 million in mineral revenue (SLB, 2023b). The revenues include the following: oil and natural gas royalties and rentals, ~\$207.05 million; coal, ~\$3.408 million; other minerals, ~\$3.026 million; and other revenues, ~\$2.231 million (SLB, 2023b). **Figure ES-6** shows the SLB revenues from FY 96/97 to FY22/23.

Lands owned by the federal government make up over 35% of Colorado’s acreage. The State of Colorado receives 50% of the rental, royalty, and bonus revenue from mineral and energy fuel leases on federal land. This includes

Severance Tax Distribution by County

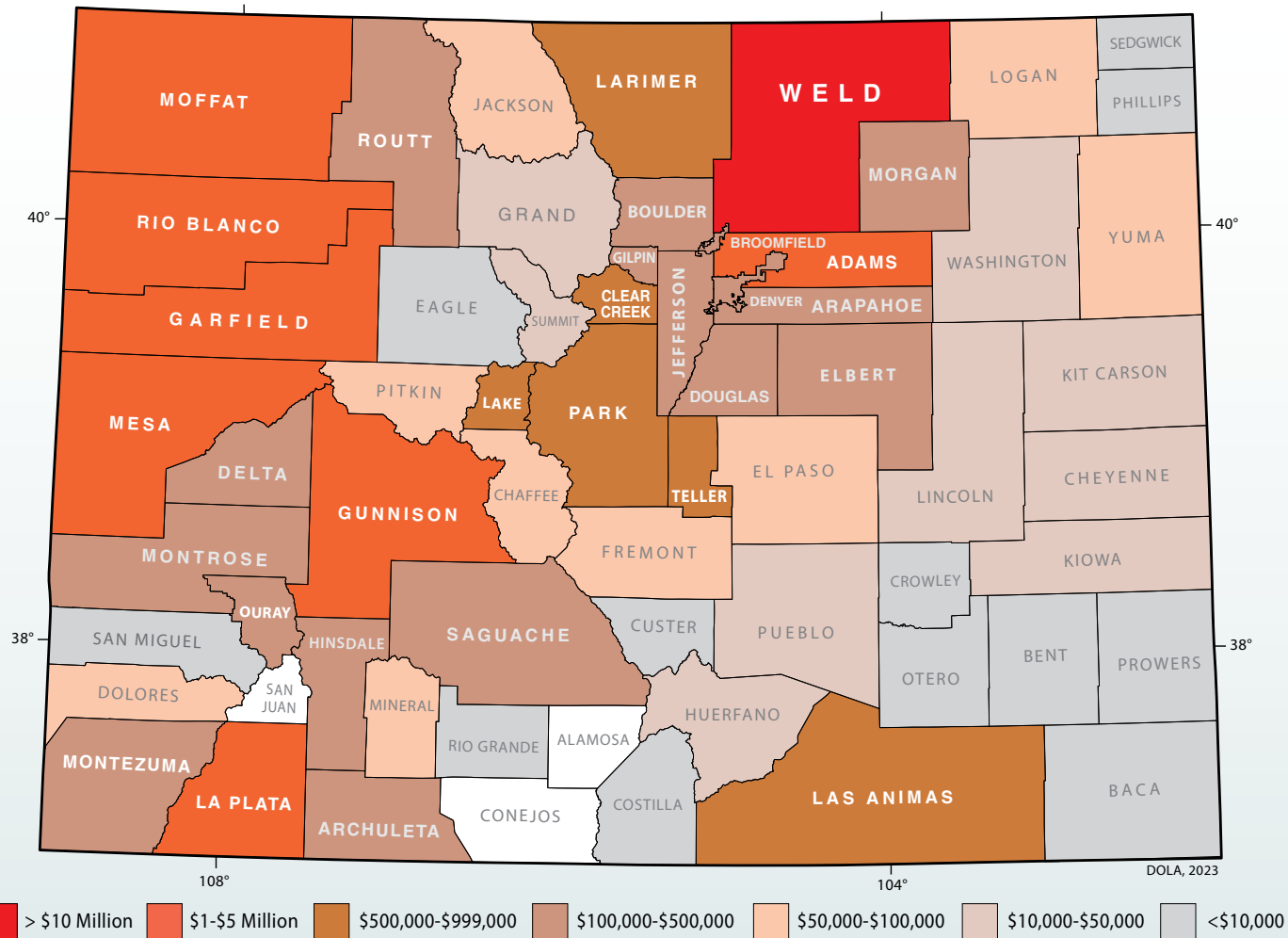


Figure ES-5. Colorado mineral severance tax distributions by county, FY 22/23.

bonus, rents, royalties, and other revenue associated with oil, gas, coal, oil shale, geothermal, and sodium (nahcolite) federal leases in Colorado. DOLA distributes a portion of these funds to local governments affected by mineral and energy development. In 2023, federal mineral lease revenues generated totaled ~\$354 million with ~\$153 million disbursed back to the state (U.S. Department of Revenue [USDR], 2024). **Figure ES-7** shows the revenue from federal mineral leases from 2009 to 2023.

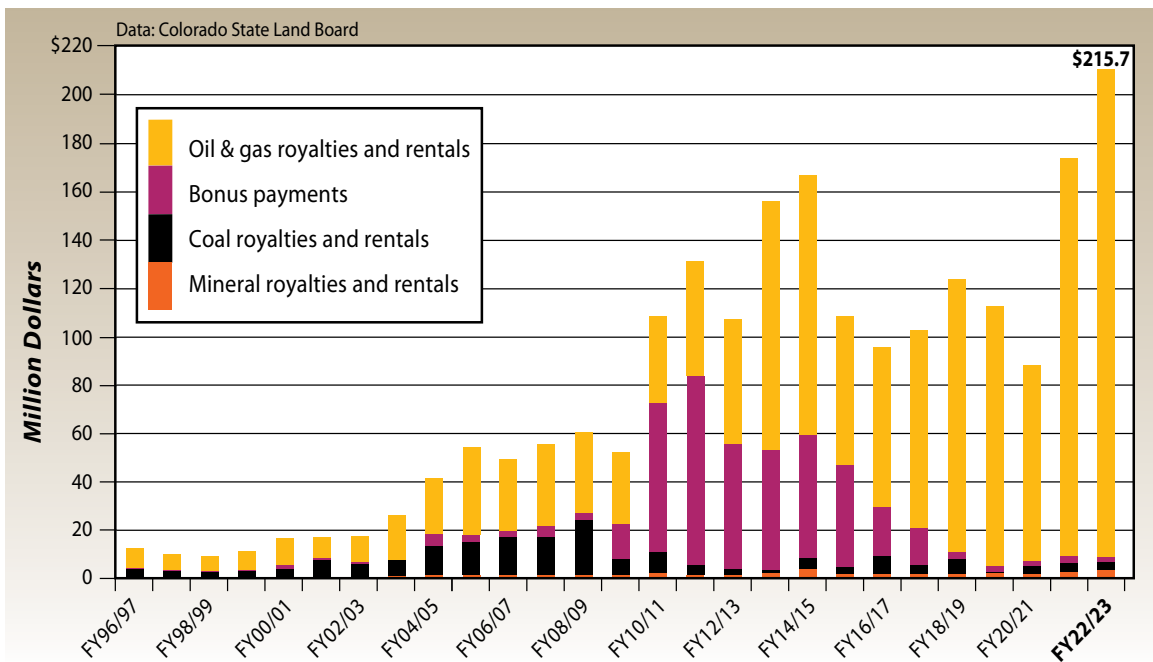


Figure ES-6. Colorado State Land Board (SLB) mineral revenues.

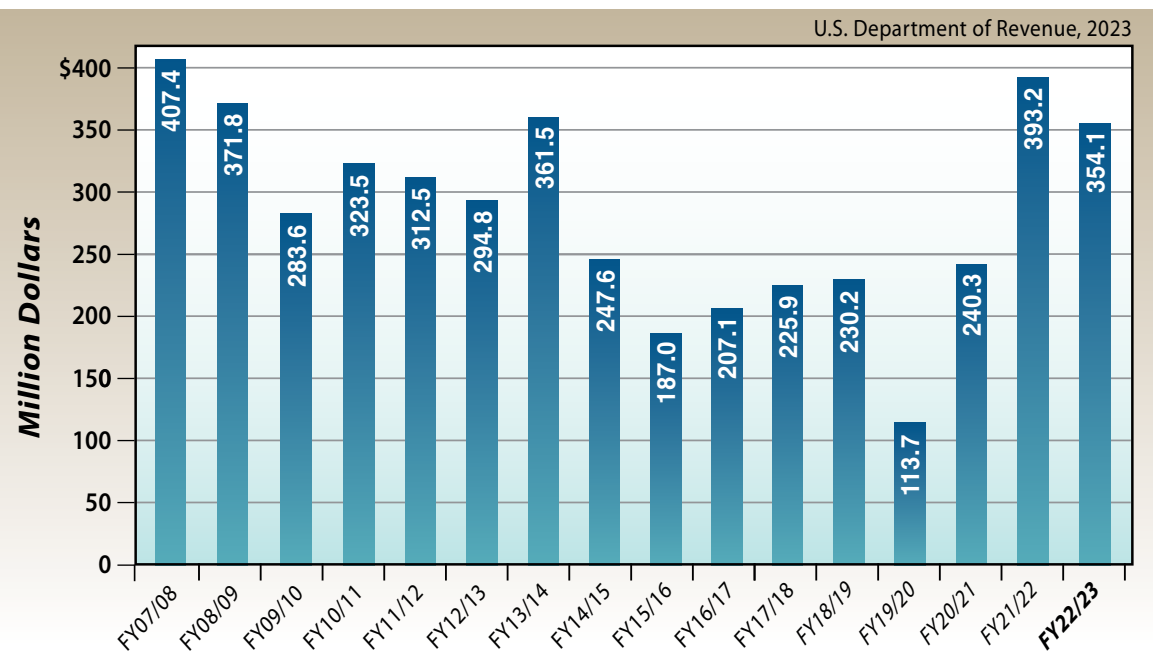


Figure ES-7. Federal mineral lease revenue generated in Colorado (50% is distributed to the state).

CONVENTIONAL ENERGY RESOURCES: PETROLEUM

Oil and Natural Gas

Most of the drilling activity and production increases in the last several years are in unconventional reservoirs, especially in the Denver-Julesburg (DJ) Basin of northeastern Colorado. The map in **Figure 1** shows the major sedimentary basins in Colorado and the location of 2023 oil and natural gas approved drilling permits (Colorado Energy and Carbon Management Commission [ECMC], 2024a). According to the U.S. Department of Energy (DOE), Energy Information Agency (EIA), ~64% of the total U.S. crude oil production in 2023, ~3.04 billion barrels, was produced from tight oil formations (EIA, 2024c). Hydraulic fracturing and horizontal drilling techniques allow relatively cheap production from unconventional reservoirs which include shale, sandstone, and carbonate rock formations with low permeability. The DJ Basin includes unconventional oil and gas resources in the Upper Cretaceous Niobrara Formation which has been a target of more recent exploration to the northeast of Denver.

Average annual oil prices decreased in 2023 to \$74.85 per barrel (EIA Colorado Domestic

Oil & Gas Well Drilling Permits in Colorado

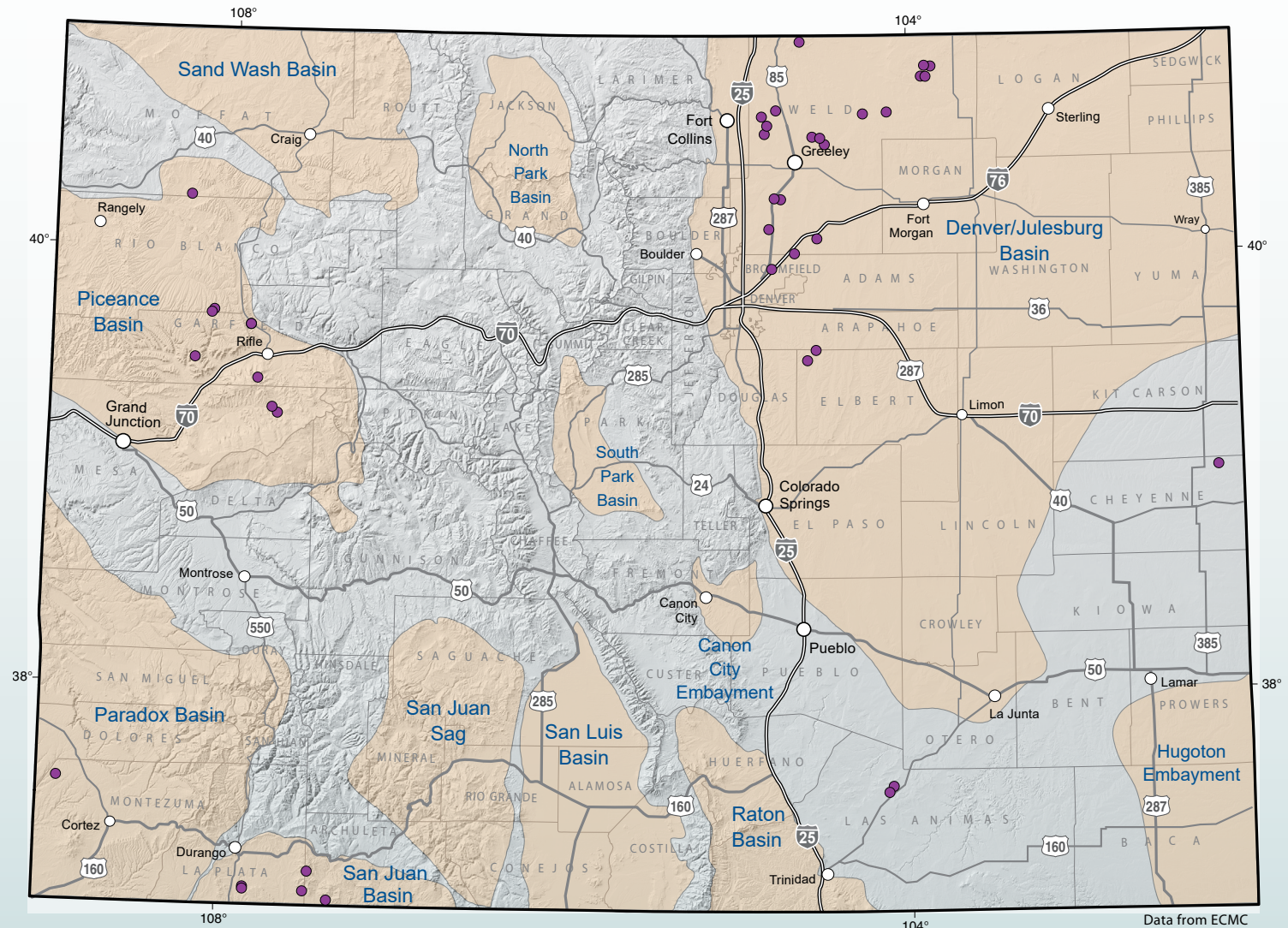


Figure 1. Sedimentary basins and the location of oil and gas well drilling permits (purple dots) approved January 2023 to December 2023.

Crude Oil First Purchase Price) from an average of \$91.84 in 2022 (EIA, 2024d). Using this price and the Colorado Energy and Carbon Management Commission (ECMC) production estimate (ECMC, 2024a), the estimated overall oil production value in 2023 for Colorado is \$12.48 billion, a decrease of ~15.2% when compared to the 2022 estimated oil production value of \$14.72 billion (**Figure 2**). Estimated oil production in Colorado between 2022 and 2023 increased by over 6.4 million barrels to ~166.8 million barrels. Oil production in Colorado and the average annual price per barrel over time are shown in **Figure 3**. At the end of 2023, Colorado ranked eighth among the top ten states with estimated proven oil reserves of ~1.442 billion barrels of oil (BO) (**Figure 4**). Texas ranked first with estimated proven oil reserves of 20.309 BO (EIA, 2024e).

The 2023 average spot price for natural gas was \$2.63 per thousand cubic feet (Mcf) (based on a heat content of 1.038 British Thermal Units per Mcf) (EIA, 2024f) (**Figure 5**). This natural gas price is ~60.7% lower than the 2022 average spot price of \$6.70 Mcf reported last year (O’Keeffe, 2024). In 2022, the annual spot price average price for natural gas was the highest since 2008 (EIA, 2023a). Colorado’s natural gas production decreased from ~1,894 billion cubic feet (Bcf) in 2022 to ~1,838 Bcf in 2023 (ECMC, 2024a).

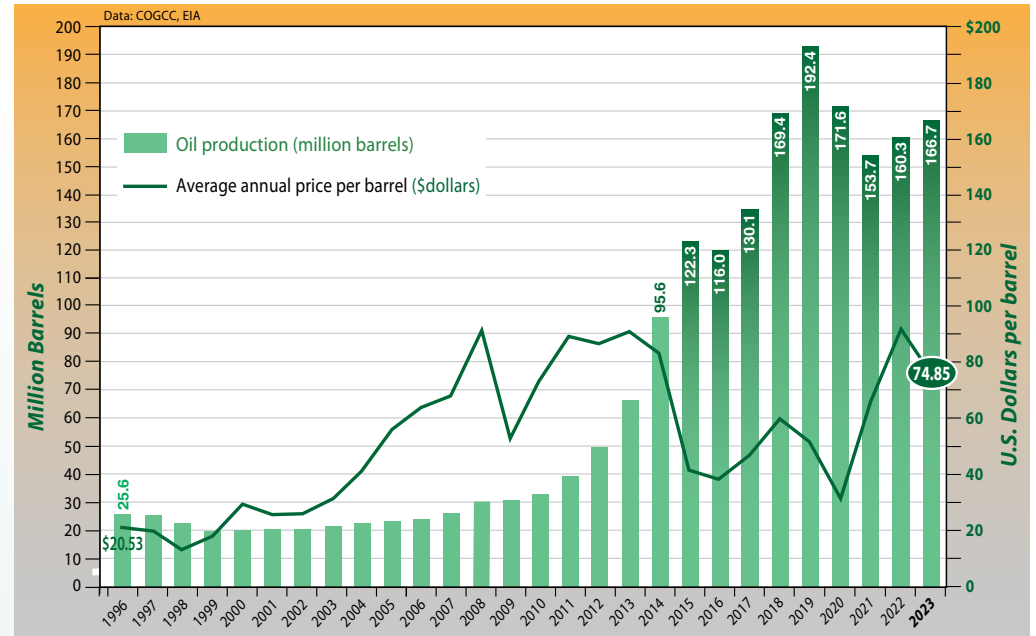


Figure 3. Colorado oil production and average annual price per barrel, 1996–2023.

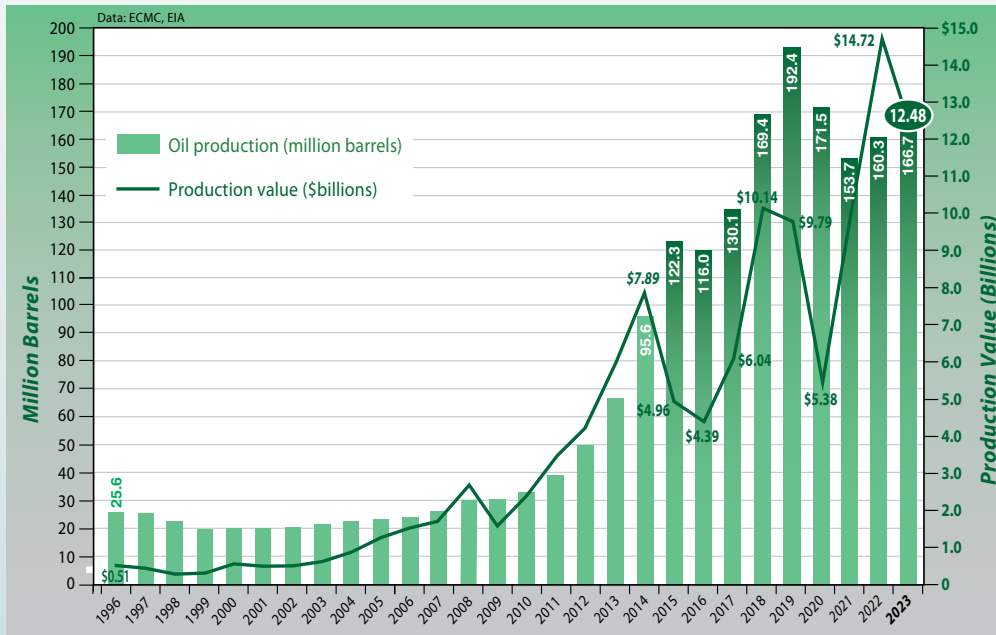


Figure 2. Oil production and estimated production value in Colorado, 1996–2023.

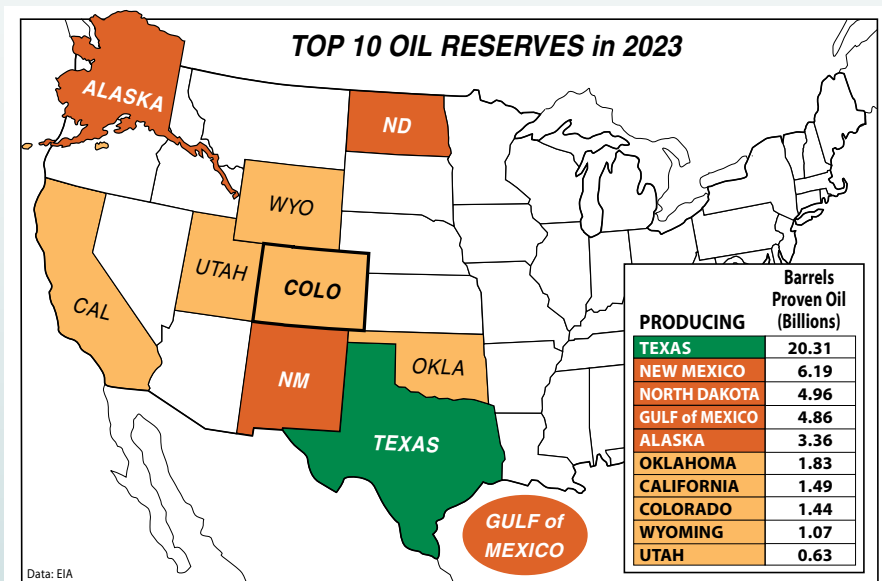


Figure 4. Top 10 states (including the Gulf) with proven oil reserves in 2023.

The estimated total 2023 natural gas production value in Colorado, using the Henry Hub spot price (EIA, 2024f) and ECMC production data (ECMC, 2024a), is \$4.83 billion. This is a decrease of ~62% compared to the 2022 estimated natural gas production value of \$12.68 billion (O’Keeffe, 2024). At the end of 2023, Colorado had estimated proved natural gas resources of 22,586 Bcf, which

was the ninth largest in the U.S. (EIA, 2024e) (Figure 6). Texas ranked first with estimated proved natural gas reserves of 170,262 Bcf.

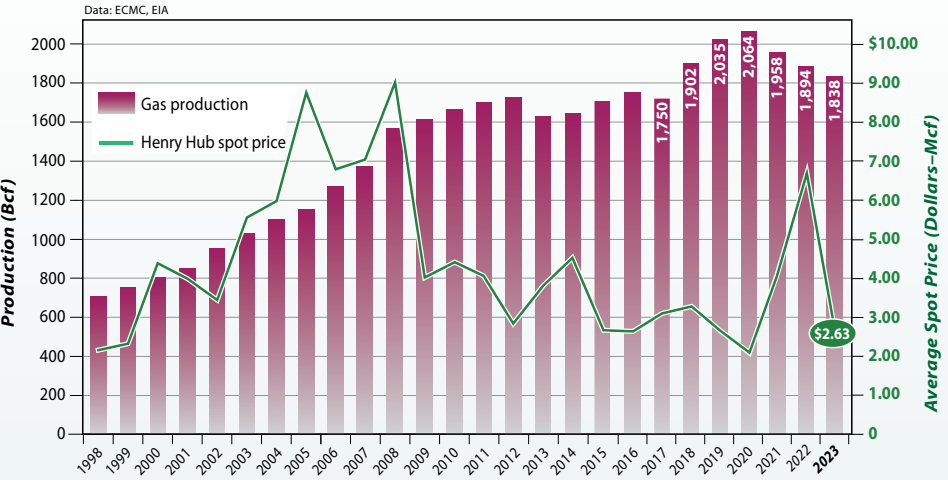


Figure 5. Colorado natural gas production and average price, 1998–2023.

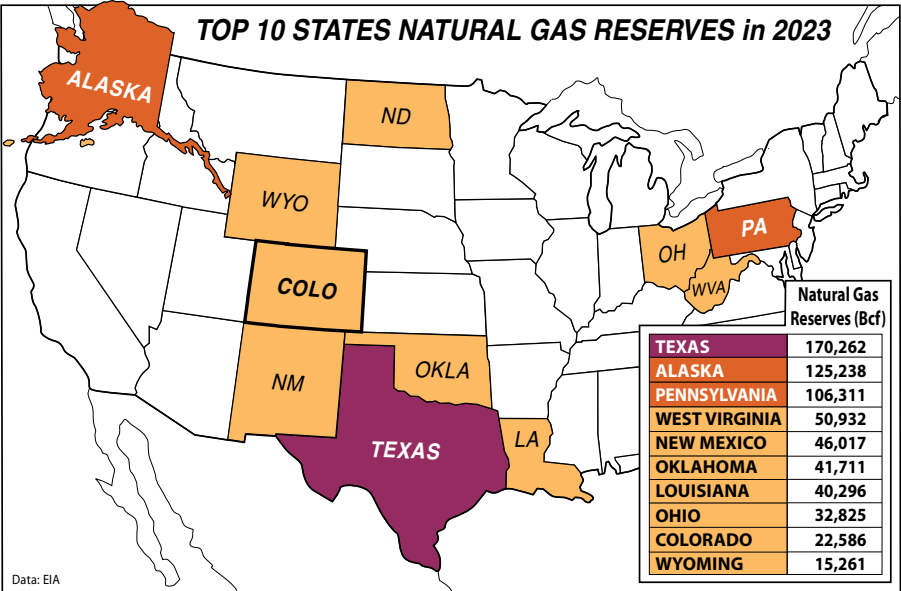


Figure 6. Top 10 states with proven natural gas reserves in 2023 (year's end).



Coalbed Methane

Figure 7 shows Colorado's annual coalbed methane (CBM) production versus conventional natural gas over time. CBM is a type of natural gas, mainly methane with minor amounts of hydrocarbons and other gases, which is generated and stored in coal beds (Zou, 2017). CBM production in Colorado reached its highest level, 59%, of the total natural gas production during 1998 and has continuously declined to ~9.7% of the total natural gas production (179 Bcf) in 2023 (ECMC, 2024a). This decline is largely due to the increase of general natural gas production as well as the development of unconventional reservoirs using horizontal drilling and hydraulic fracturing techniques.

County Rankings – Oil and Natural Gas Production

Colorado oil production increased ~152% in the last ten years mostly due to the increased use of horizontal drilling and fracturing techniques. Thirty-six of Colorado's 64 counties produced crude oil and/or natural gas in 2023. To rank each county's contribution to the state's total production value, production from each county was multiplied by average annual prices. The EIA 2023 Colorado First Purchase price of \$74.85 per BO for the average annual price of oil (EIA, 2024f) and the average spot price for natural gas of \$2.63 per Mcf (EIA, 2024d) were used with the ECMC (2024a) production totals to calculate the production values. The total 2023 estimated oil and natural gas production value for Colorado is ~\$17.3 billion. **Figure 8** shows the estimated total oil and natural gas production value by county.

As it has been for many years, Weld County is the single largest producer of oil and natural gas in Colorado with an estimated total production value of ~\$12.57 billion in 2023. A large portion of more recent crude oil production is from the Upper Cretaceous Niobrara Formation in Weld County which is within the DJ Basin (Figure 1) and Wattenberg Field. This field is one of the top ten oil and natural gas fields based on proved reserves (EIA, 2024g). The Wattenberg Field has been one of the most important oil and gas reservoirs in Colorado for the last 50 years where several conventional and unconventional resources have been developed since its discovery in 1970 (Sonnenberg, 2016). In the Denver Basin (a large asymmetric basin formed largely during the Laramide orogeny), the Niobrara Formation (~82 to 89.5 Ma) was deposited in the Western Interior Seaway during a major marine transgression and consists of deep-water chalks and marl units (Sonnenberg, 2016).

In 2023, Adams County has the second largest natural gas and oil production value with an estimated total of \$1.10 billion. Garfield County ranks third in natural gas and oil production value with an estimated total of ~\$1.03 billion. Most of the production value in Garfield County is from the production of natural gas (~92.3%). Arapahoe and La Plata counties have a combined oil and natural gas production value of \$1.14 billion. **Figures 9 and 10** show the estimated oil and natural gas production by county for 2023, respectively.

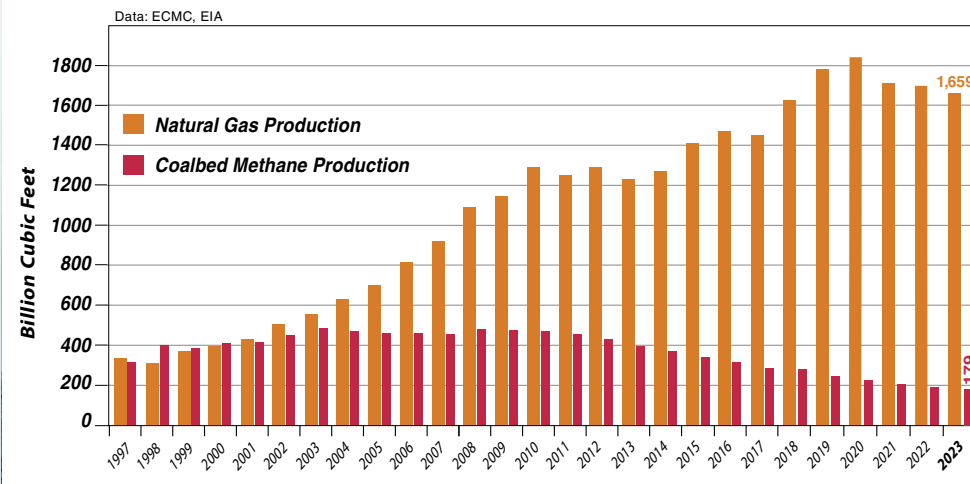
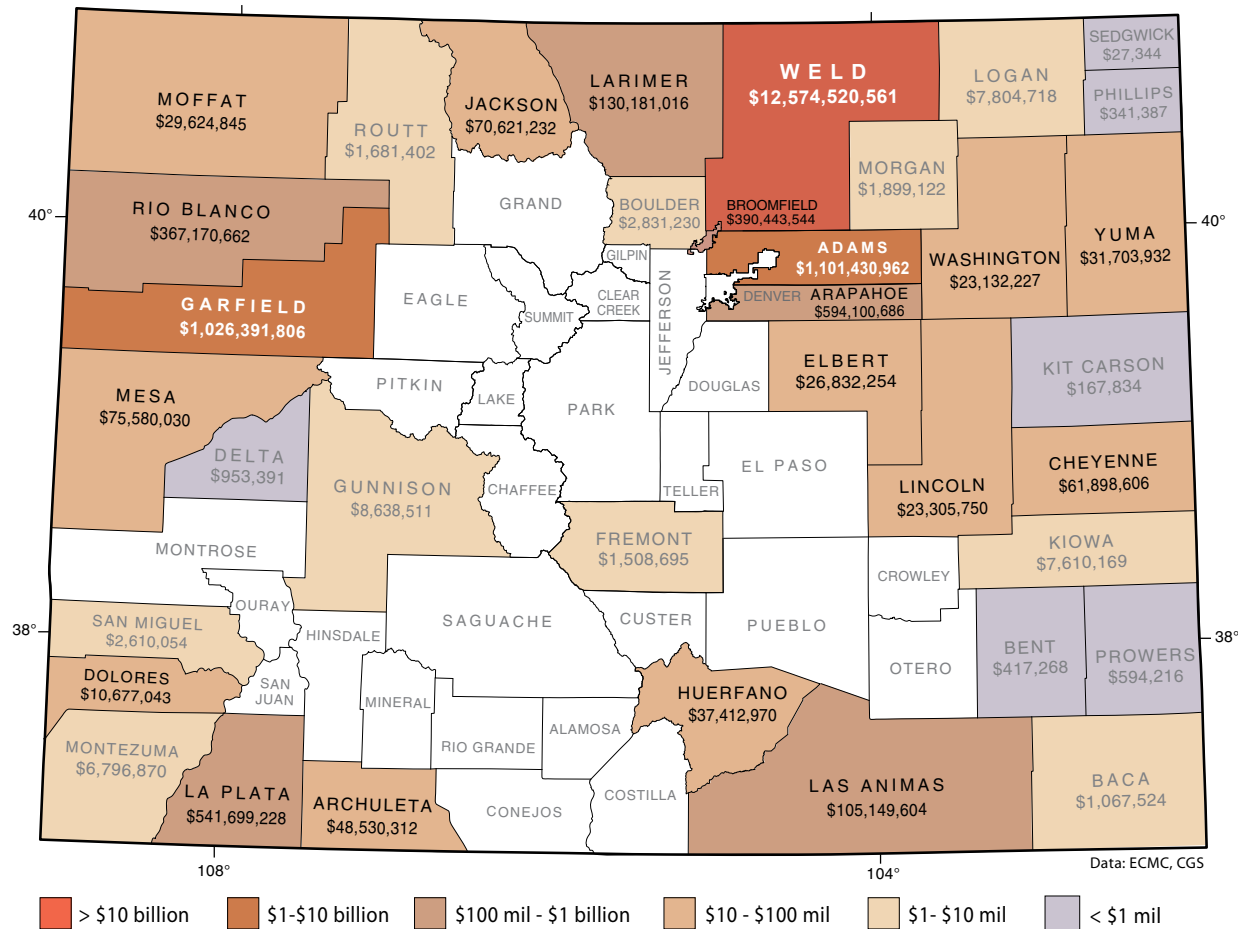


Figure 7. Coalbed methane vs. non-coalbed natural gas production in Colorado, 1997-2023.



Estimated 2023 Oil and Gas Production Value by County



contain 4.285 trillion barrels of recoverable oil (USGS, 2013). The Piceance Basin, a subbasin within the Greater Green River Basin, has an estimated 1.525 trillion BO of this potential resource with ~920 billion BO in place at an oil yield of 15 gallons per ton (gpt) or greater and ~352 billion BO at an oil yield of 25 gpt or greater (USGS, 2013). For more details about this assessment, see Johnson and others (2011).



The Colorado Energy and Carbon Management Commission (ECMC) officially changed its name from the Colorado Oil and Gas Conservation Commission in July 2023. As reported in previous MEIA reports (O’Keeffe, 2022; 2023; 2024), Colorado Senate Bill (SB) 19-181 passed in 2019 requires the ECMC to place more emphasis on public and environmental health and safety and addressing cumulative impacts from oil and gas activities. Additionally, the new law redefined the agencies mission which is now to “*regulate the development and production of the natural resources of oil and gas in the state of Colorado in a manner that protects public health, safety, welfare, the environment and wildlife resources.*” More information on the ECMC’s mission change and rulemaking efforts can be found here:

<https://ecmc.state.co.us/hearings.html#/rulemaking>

Figure 9. Total oil production by county in Colorado, 2023.



2023 Natural Gas Production (Bcf) by County

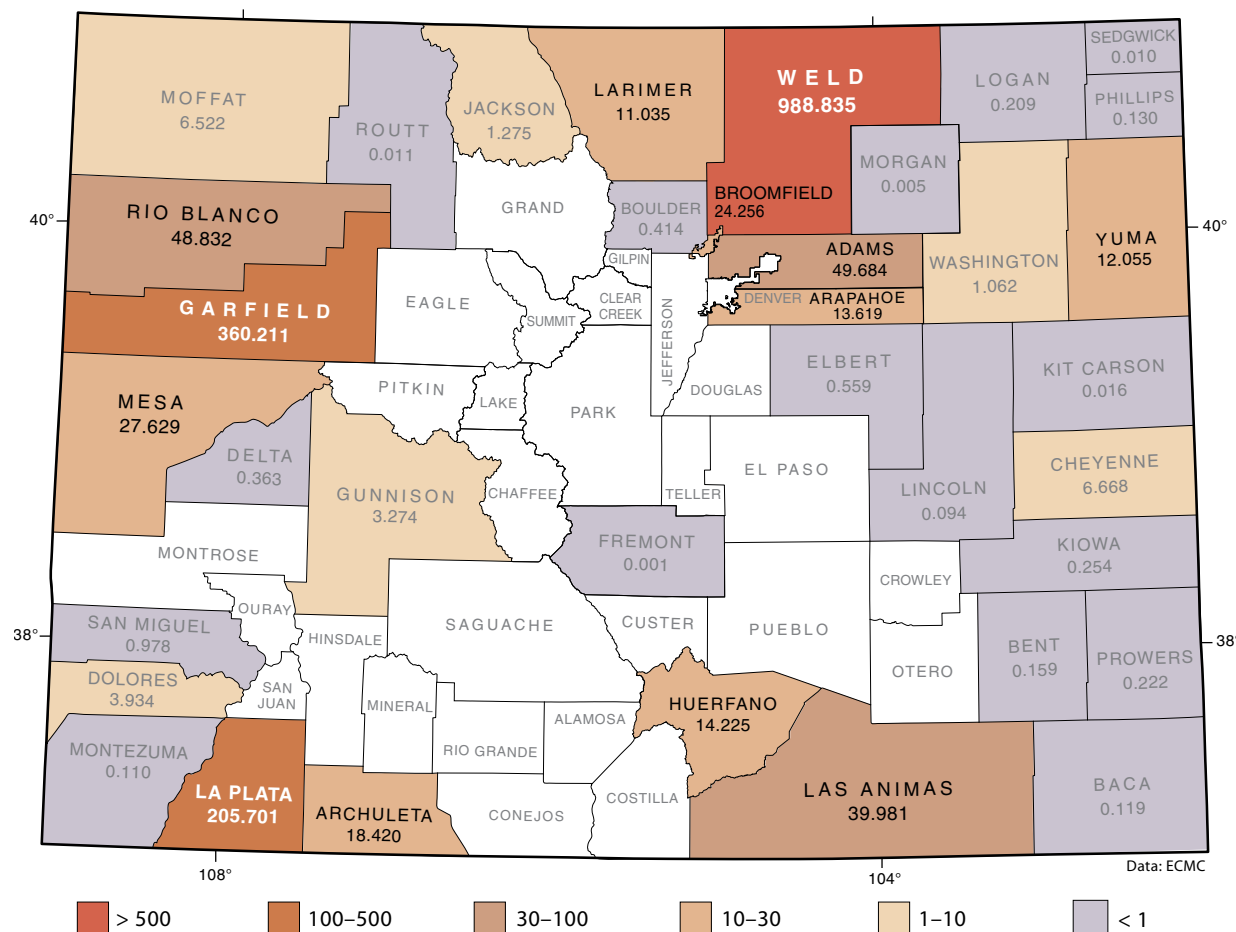


Figure 10. Total natural gas production (Bcf) by county in Colorado, 2023.

In 2023, as reported by the ECMC (ECMC, 2024b), Colorado SB 23-285 entitled “Energy & Carbon Management In Colorado” passed into law which included expanding the ECMC’s regulatory authority over emerging energy technologies including geothermal, underground natural gas storage, and carbon capture and storage (CCS). In 2023, state legislature passed SB 23-016 which directs the ECMC to seek primacy for Class VI injection well regulatory authority from the U.S. Environmental Protection Agency (ECMC, 2024b) for underground injection wells associated with carbon capture and storage.

Additionally, SB 23-285 gave the ECMC regulatory authority over deep (non-tributary to water rights in nature and deeper than 2,500 feet below the ground surface) geothermal resources in Colorado. The ECMC is working with stakeholders to create a deep geothermal resource permitting and oversight process (ECMC, 2024b). ECMC rulemakings are available on their website:

<https://ecmc.state.co.us/hearings.html#/rulemaking>

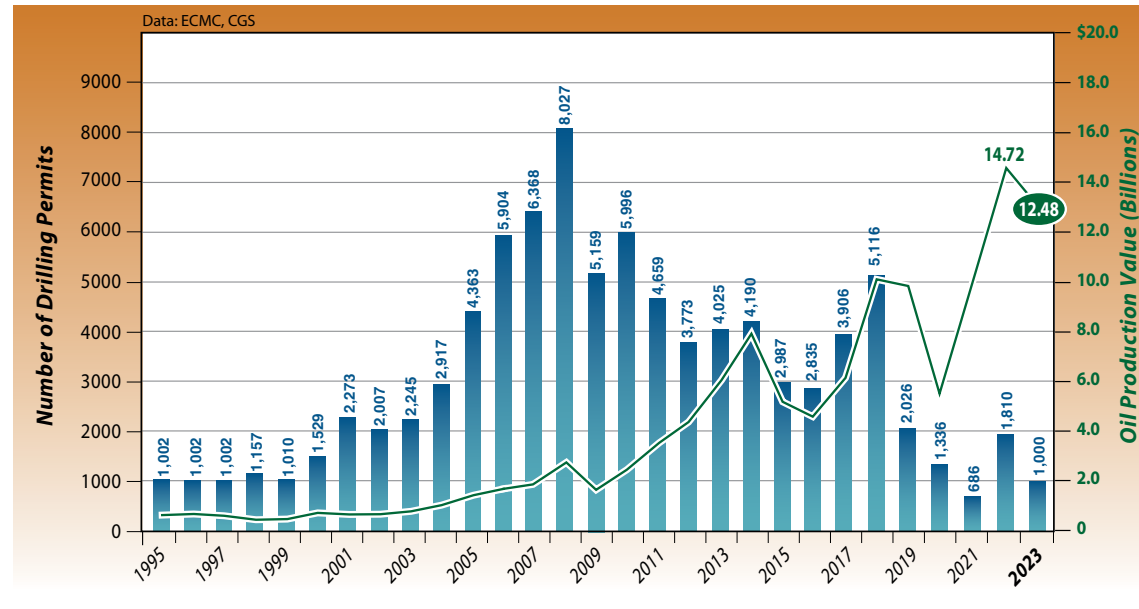


Figure 11. Annual oil and gas drilling permits and oil production value in Colorado, 1995–2023.



CONVENTIONAL ENERGY RESOURCES: COAL

Domestic coal production decreased 2.7% compared to 2022 mostly due to decreased production west of the Mississippi River (EIA, 2024b). Although U.S. coal production has generally decreased since 2012, coal is still a significant source of Colorado's electrical power. In 2023, coal-fired plants provided ~32% of Colorado's net electricity generation while natural gas (29%) and renewable resources (~39%), especially wind (28% of the renewable electricity generation) and solar power, accounted for remaining generation (EIA, 2024g).

For comparison, in 2015, 60% of the electricity generated in Colorado came from coal. The general decline of the use of coal for electricity generation is due to lower natural gas prices, federal greenhouse gas regulations and taxes designed to cut carbon dioxide emissions, government subsidies, and the growing use of renewable energy sources. In 2022, domestic renewable electric generation surpassed coal and nuclear in the power sector for the first time (EIA, 2023b). In 2023, natural gas, coal, and renewables accounted for ~43.1%, ~16.2%, and 21.4% of the total U.S. utility-scale electricity generation, respectively (EIA, 2024h).

Between 2011 and mid-2020, 96 gigawatts (GW) of coal electricity generating capacity were retired in the U.S., or switched to another fuel (EIA, 2020). In 2021, the EIA reported that power plants plan to retire 28% (59 GW) of the current coal-fired power capacity by 2035 (EIA, 2021). These closures will decrease the U.S. coal electricity generating capacity to less than 200 GW which is a ~36% decrease compared to its peak of 314 GW in 2011 (EIA, 2020). As of September 2021, ~212 GW of coal-fired generating capacity was operating in the U.S. (EIA, 2021). In 2023, utility-scale coal-fired generating capacity decreased to 181 GW (EIA, 2024. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php>).

In 2010, Colorado passed the Clean Air, Clean Jobs Act which promotes the replacement of Front Range coal-fired power plants with natural gas plants. Since 2010, utilities have shut down several coal-fired plants and other units have been converted to natural gas. The last several MEIA reports give a summary of these shutdowns/conversions since 2012 (O'Keeffe, 2024). Additionally, the Colorado General Assembly passed the Greenhouse Gas Emission Reduction Measures bill (SB23-016) in 2023 which outlines the goals for additional greenhouse gas emission reductions in Colorado (Colorado General Assembly, 2023). Coal-fired plants that will retire in the future include:

- In 2020, the Craig Generating Station in Moffat County announced it would close coal-fired units 1, 2, and 3 by 2025, 2028, and 2028, respectively (Colorado Sun, 2023).

- In early 2021, Xcel Energy announced that Hayden Generating Station in Moffat County would close coal-fired Unit 1 by the end of 2028 and Unit 2 by the end of 2027 (Xcel, 2022).
- The Pawnee Station will convert to natural gas by 2026 (Xcel, 2022).
- Rawhide and Nixon power stations will retire in 2030.
- Comanche Station will be fully retired by the end of 2030.

Colorado has some of the cleanest burning coal (low-sulfur and mercury content) in the U.S. and several CGS publications include summary information about Colorado's coal quality compared to other regions (Carroll, 2004). Power generation in Colorado consumes ~49% of the coal mined in the state. The rest is shipped to ~17 other states or exported to other countries (EIA, 2024j). Coal production from Colorado mines in 2023 is 11.71 million tons (DRMS, 2024). The estimated value of Colorado coal production in 2023 is \$692 million (**Figure 12 and Table 1**) and the estimated average value of a ton of Colorado coal is \$59.12 (EIA, 2024b). Colorado coal production and average prices since 2001 are shown in **Figure 13**. In 2023, six Colorado coal mines were active (**Table 2**) employing 1,043 coal miners (DRMS, 2024) (**Figure 14**).

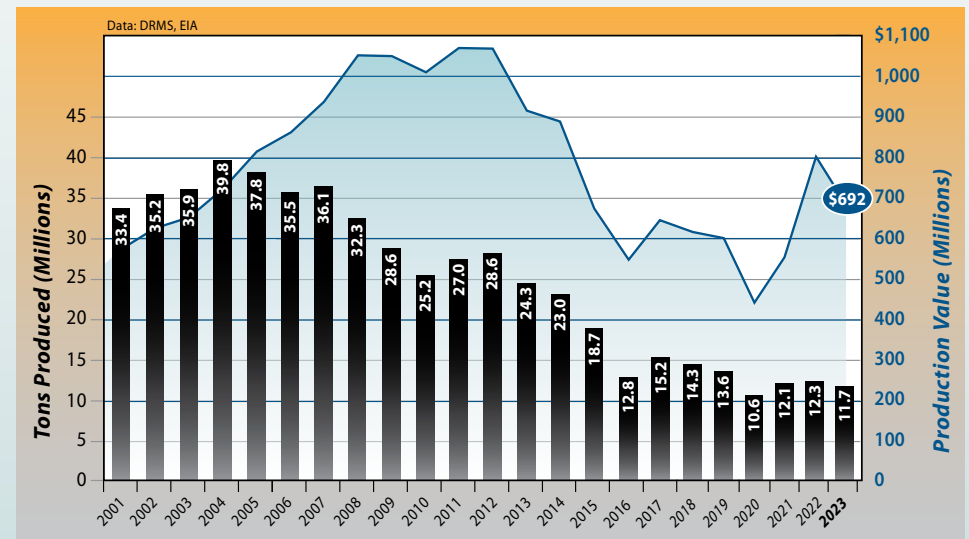


Figure 12. Production and value of coal mined in Colorado, 2001–2023.

Table 1. Coal production, price, value, and employment, 2002–2022.

Year	Production Tons (Millions)	Colorado Average Annual Coal Price \$/Ton	Product Value (Millions)	Coal Miner Employment
2002	35.20	\$17.72	\$624	1,854
2003	35.88	\$18.21	\$653	1,859
2004	39.81	\$18.10	\$721	1,903
2005	37.82	\$21.63	\$818	1,963
2006	35.49	\$24.27	\$861	2,065
2007	36.14	\$25.99	\$939	2,069
2008	32.34	\$32.67	\$1056	2,124
2009	28.58	\$36.71	\$1049	2,247
2010	25.21	\$40.00	\$1008	2,061
2011	27.03	\$39.88	\$1078	2,254
2012	28.64	\$37.54	\$1075	2,279
2013	24.27	\$37.58	\$912	1,857
2014	22.98	\$38.64	\$888	1,512
2015	18.73	\$36.12	\$676	1,326
2016	12.80	\$42.54	\$499	1,211
2017	15.18	\$42.52	\$645	1,119
2018	14.28	\$43.30	\$618	1,160
2019	13.63	\$44.21	\$602	1,098
2020	10.63	\$41.45	\$441	901
2021	12.14	\$46.02	\$559	957
2022	12.33	\$65.00	\$802	1,093
2023	11.71	\$59.12	\$692	1,043

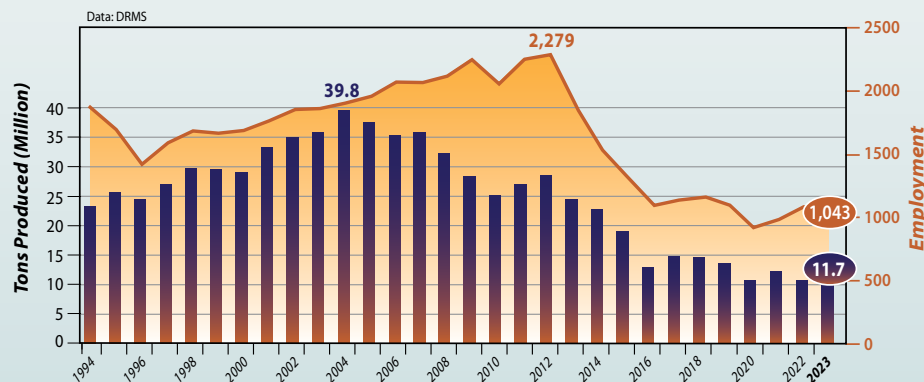


Figure 14. Coal production and employment in Colorado, 1994–2023.

In 2023, Colorado was ranked 10th in coal production in the U.S. (**Figure 15**) (EIA, 2024b). Wyoming, the leading U.S. producer by far (~237.26 million tons), mined over 19 times as much coal as Colorado. The locations of Colorado’s active coal mines, coal-fired power plants, coal types and regions, and estimated coal-fired plant closing dates are shown on **Figure 16**.

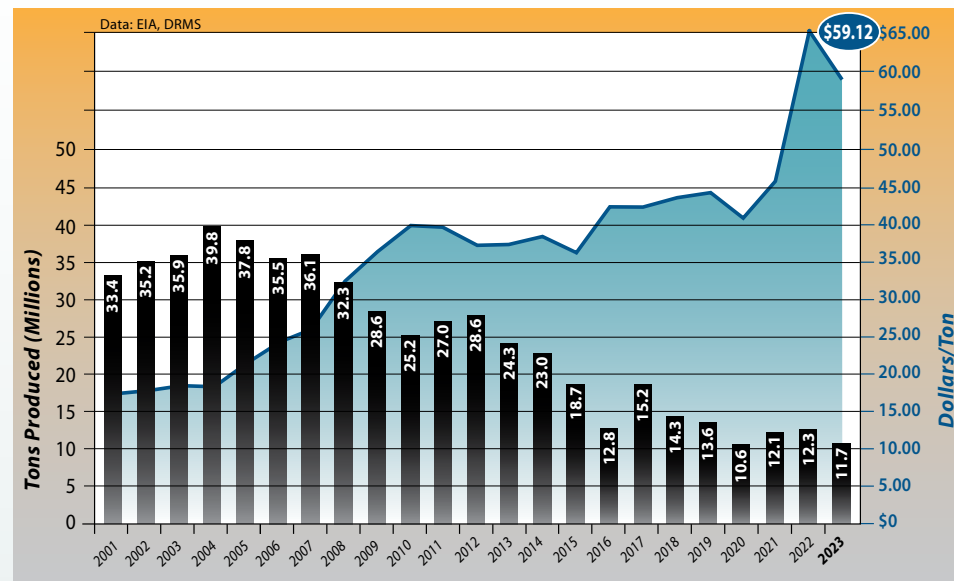


Figure 13. Coal production and average annual coal price in Colorado, 2001–2023.

Table 2. Active coal mines in Colorado, 2022.

Mine	Operator	County	Mine Type	2023 Prod. (tons)
New Elk Mine	Basin Resources	Las Animas	Underground	0
Colowyo	Colowyo Coal Co. L.P.	Moffat	Surface	1,702,989
Deserado	Blue Mountain Energy	Rio Blanco	Underground	2,990,867
Foidel Creek	Twentymile Coal Co./Peabody Energy	Routt	Underground	1,284,608
King II	GCC Energy LLC	La Plata	Underground	643,142
Trapper	Trapper Mining Inc.	Moffat	Surface	1,602,945
West Elk	Mountain Coal Co./Arch Coal	Gunnison	Underground	3,419,612
Total				11,709,602

Data: DRMS

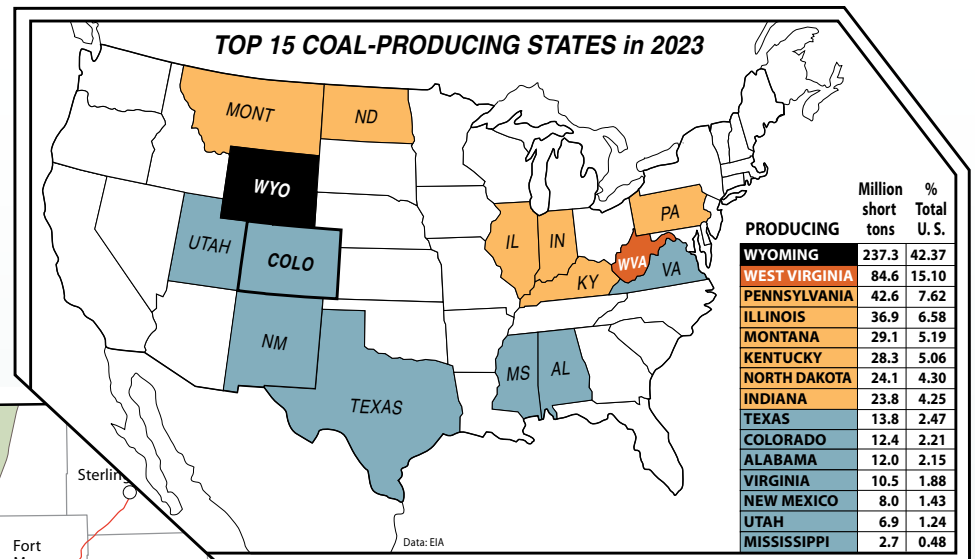


Figure 15. Top 15 coal-producing states in 2023.

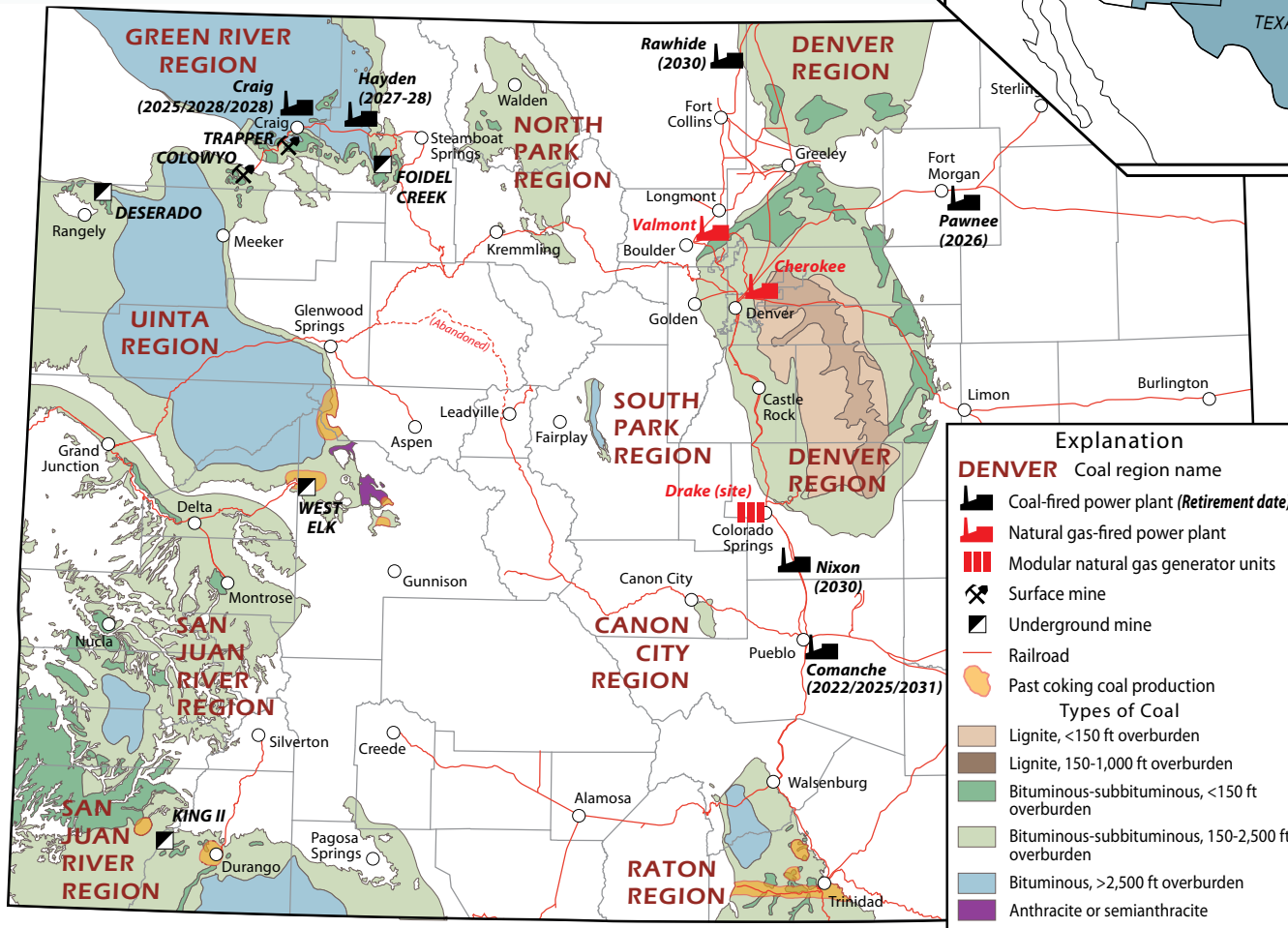


Figure 16. Locations of active coal mines, power plants, railroads, and coal-bearing regions in Colorado, 2023. Dates in parentheses are estimated retirement dates for coal-burning units.

CONVENTIONAL ENERGY RESOURCES: URANIUM

According to the EIA, the total 2023 U.S. production of uranium concentrate (triuranium octoxide) remained near all-time lows (~50,000 pounds) and decreased by 74% when compared to 2022 (~194,000 pounds) (EIA, 2024k). Although Colorado has been a producer of uranium in the past, there were no producing uranium mines or mills in 2023 within the state. Most of the uranium purchased by U.S. civilian nuclear power reactors over the last several decades was imported from foreign countries. In 2023, 51.6 million pounds of triuranium octoxide was purchased by owners and operators of these nuclear power plants with ~95% purchased from foreign suppliers (EIA, 2024l). In 2023, most of the uranium delivered to U.S. civilian nuclear power reactors came from other countries including Canada (27%), Kazakhstan (22%), Australia (22%), Russia (12%), and Uzbekistan (10%) (EIA, 2024l). Although oil, natural gas, and coal imports from Russia were banned in 2022 (White House, 2022), uranium was not. However, in 2024, the U.S. passed H.R. 1042 Prohibiting Russian Uranium Imports Act which limits the importation of uranium to the U.S. from Russia (U.S. Congress, 2024).

In 2023, the DOE published a list of critical materials that included uranium. They classified uranium, as well as other materials, as “near critical” in the short term (2020 to 2025). A near critical classification indicates that the importance to energy is high but the short-term supply risk is lower than other materials. DOE short-term critical materials, with regards to their importance to energy and supply risk, included dysprosium, cobalt, gallium, graphite, iridium, neodymium, and terbium (DOE, 2023).

The weighted-average price reported by the EIA for uranium increased slightly from \$39.08 per pound in 2022 to \$43.80 per pound in 2023 (EIA, 2024l). Average spot prices of uranium in 2023 were about 62.51 per pound and increased to an average of about \$87.93 per pound through September 2024 (Cameco, 2024). **Figure 17** shows the average annual spot uranium prices in the U.S. since 2002. **Figure 18** shows the estimated annual production of uranium concentrate in the U.S. between 1996 and 2023.

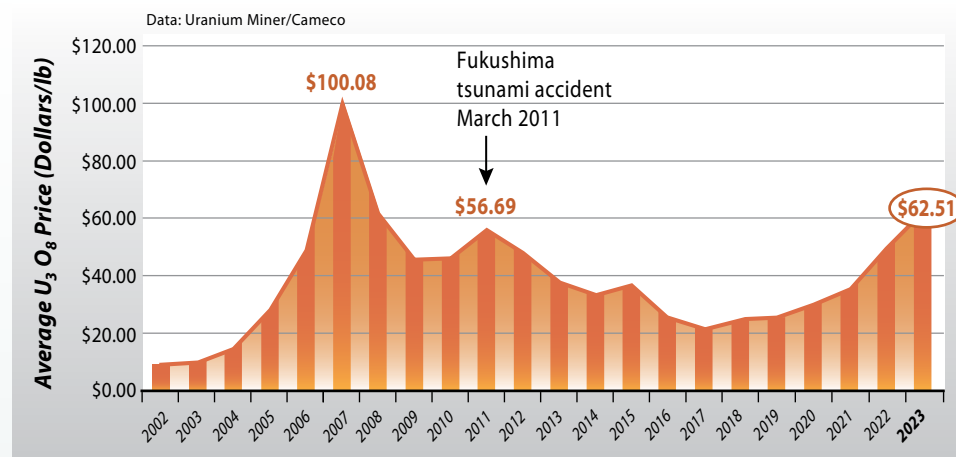


Figure 17. Average annual U₃O₈ price per pound in U. S., 2002–2023.

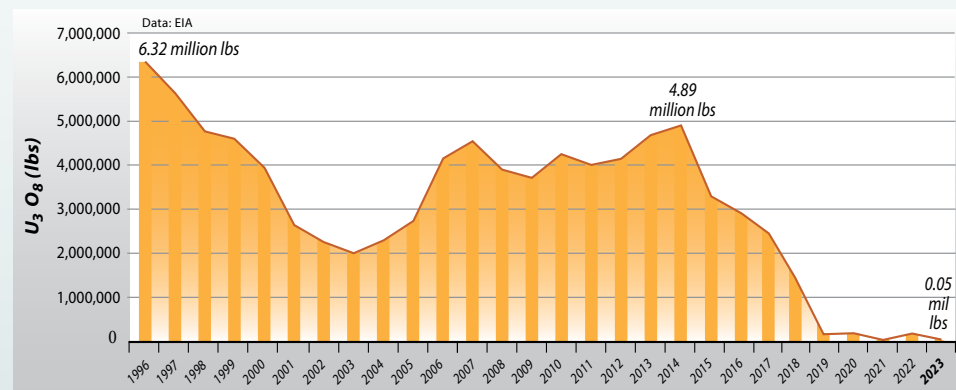


Figure 18. Annual production of uranium concentrate in U. S., 1996–2023.

NON-FUEL MINERAL RESOURCES

Non-fuel mineral resources include metals, industrial minerals, and construction materials (e.g., gold, molybdenum, Portland cement, crushed rock, sand, and gravel). The total U.S. 2023 non-fuel mineral production value was estimated at \$105 billion, a ~7.3% increase from last year's estimated total of \$98.2 billion (USGS, 2024a). Colorado ranked 15th in U.S. non-fuel mineral production value and produced an estimated \$2.22 billion, or ~2.12% of the estimated total U.S. production value (USGS, 2024a). **Figure 19** shows the estimated non-fuel mineral production value in Colorado over time.

Metal Mining

Metals mined in Colorado include gold and molybdenum. The CGS estimates that the 2023 production value of gold and molybdenum in Colorado is ~\$1,066 million. This is ~12.8% higher than the estimated value of these two commodities in 2022 of ~\$945 million mainly due to the higher average price of molybdenum. Silver is also produced in Colorado and is a by-product of gold mining. Silver production values for Colorado were unavailable.

Molybdenum

Molybdenum is typically used in the production of engineering steels, stainless steel, molybdenum metal, tool steels, nickel alloys, foundries, and chemical production. In 2022, according to the International Molybdenum Association

(IMO, 2022), about 87% of the world production of new molybdenum (not recycled or remelted) was used in engineering steels, stainless steels, tool steels, foundries, and other metals and alloys. About 13% was used in chemical production (IMO, 2024). The global production of molybdenum was ~573 million pounds in 2023 (USGS, 2024a). The top 2023 producers included: China (~243 million pounds), Chile (~101 million pounds), and the U.S. (~75 million pounds) (USGS, 2024a).

Colorado's annual production and the average annual price per pound for molybdenum trioxide (MoO_3) are shown in **Figure 20**. Estimated average prices increased from \$18.76 in 2022 to \$25.22 per pound in 2023 (USGS, 2024a). Most of the 2023 primary molybdenum production in the U.S. was from two Colorado mines that produced ~30 million pounds combined (Freeport, 2024a). In the U.S., Colorado ranked second in molybdenum production following by molybdenum recovered as a by-product of copper mining at Arizona mines (**Figure 21**).

Colorado hosts several known Climax-type porphyry molybdenum deposits. These are relatively rare deposit types found in the continental interior of western North America (Ludington and Plumlee, 2009; Audetat and Li, 2017). Freeport mines some of these deposits at their Climax and Henderson mines in Colorado. The Climax open pit mine is located northeast of Leadville, at Fremont Pass. As reported by Freeport, it includes a 25,000 metric ton per day mill with the ability to produce ~30 million pounds of molybdenum per year. The company reopened the mine in mid-2012 after a 17-year shutdown. Freeport reports that the Climax

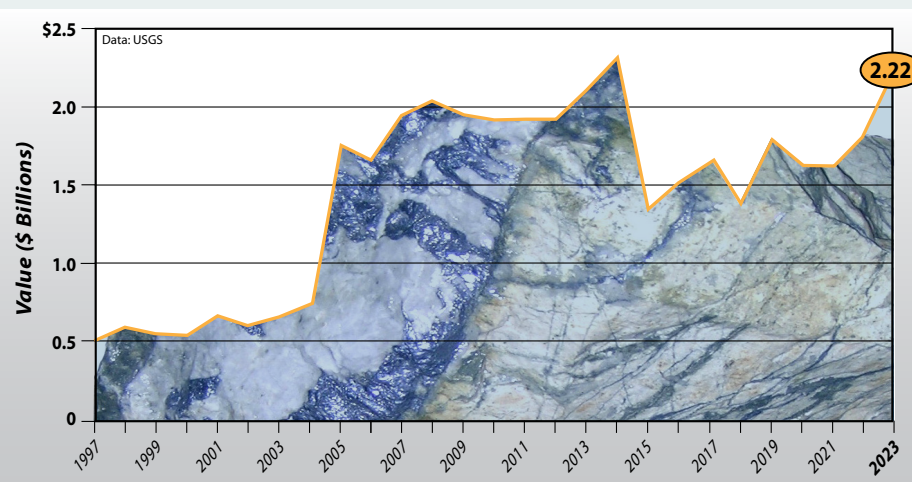


Figure 19. Total non-fuel mineral production value in Colorado, 1997–2023.

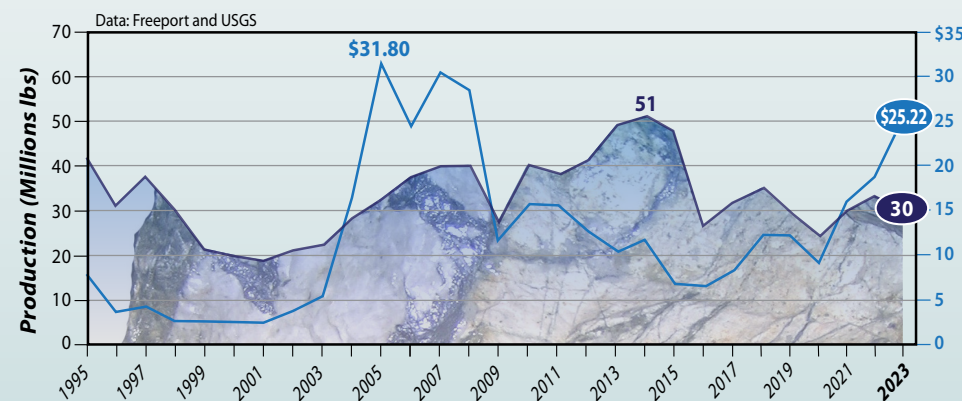


Figure 20. Molybdenum production in Colorado and average annual price 1995–2023.

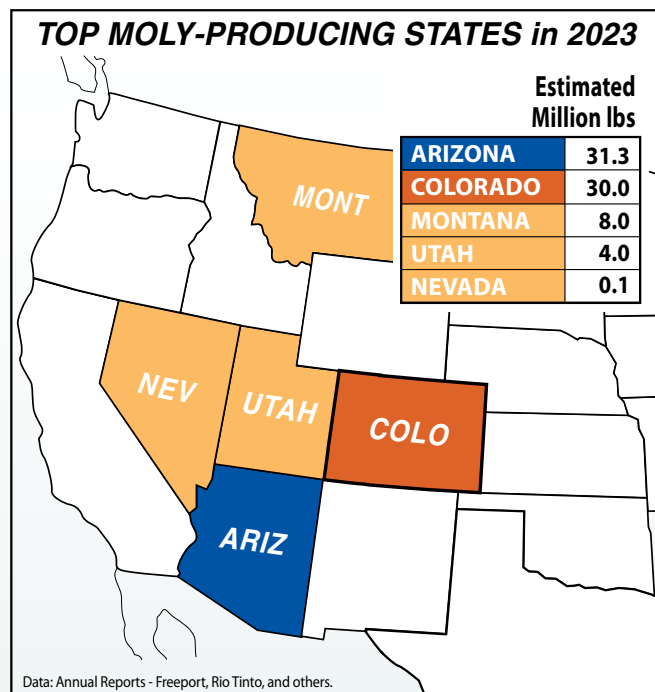


Figure 21. Top molybdenum producing states, 2023.

open pit mine produced 17 million pounds in 2019, 14 million pounds in 2020, 18 million pounds in 2021, 21 million pounds in 2022, and 17 million pounds in 2023. At the end of 2023, Freeport also reported that the Climax Mine had 137 million metric tons of proven reserves at an average grade of 0.15% molybdenum and 12 million metric tons of probable reserves at an average grade of 0.10% (Freeport, 2024a).

The Henderson Mine, located near Empire in Clear Creek County, has been in operation since 1976. Per Freeport, this operation is a large block-cave underground mine connected to a 32,000 metric tons per day concentrator in adjoining Grand County by a 15-mile-long conveyor. Freeport reported that the Henderson Mine produced 12 million pounds in 2019, 10 million pounds in 2020, 12 million pounds in both 2021 and 2022, and 13 million pounds in 2023. In 2023, Freeport also reported that the Henderson Mine had 34 million metric tons of proven reserves at an average grade of 0.18% molybdenum and probable reserves of 14 million metric tons at an average grade of 0.12% (Freeport, 2024a).

Gold

U.S. gold mine production decreased from 173 metric tons (~5.562 million troy ounces) in 2022 to an estimated 170 metric tons (5.466 million troy ounces) in 2023 with a value over \$10 billion based on average prices reported by the USGS (USGS, 2024a). In 2023, the U.S. was the fifth largest producer of gold (~170 metric tons) in the world following China (~370 metric tons), Australia (~310 tons), Russia (~310 tons), and Canada (~200 tons). World production of gold in 2023 was ~3,000 metric tons (~96.45 million ounces) (USGS, 2024a).

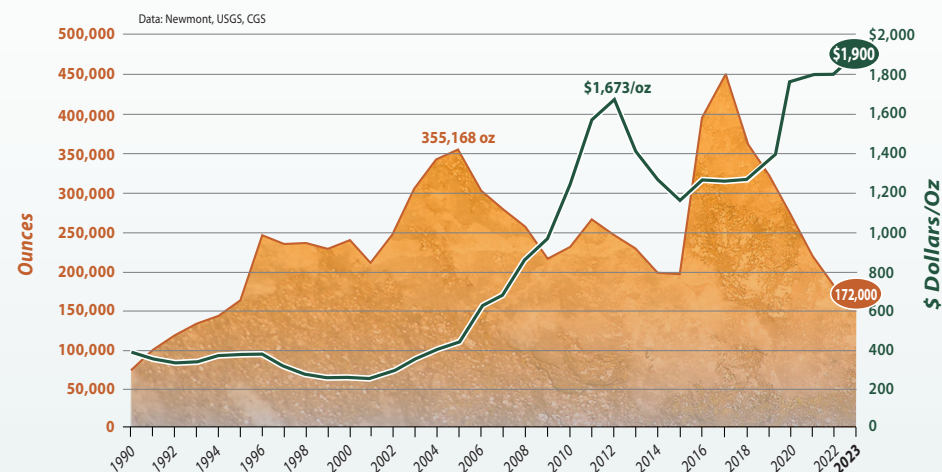


Figure 22. Colorado estimated gold production and average annual price per ounce, 1990–2023.

Figure 22 shows the price of gold and Colorado gold production from 1990 to 2023. In 2023, Colorado was the third largest producer of gold (172,000 ounces) in the U.S. (**Figure 23**) following Nevada (~4,030,556 ounces) and Alaska (~728,000 ounces). The average 2023 gold price remained about the same as 2021 at \$1,900 per ounce from \$1,802 per ounce in 2022 (USGS, 2024a).

Gold production at Newmont Corporation's (Newmont) Cripple Creek and Victor (CC&V) open pit mine located in Teller County decreased from 182,000 in 2022 to 172,000 ounces in 2023 (Newmont, 2024a). CC&V also produces silver; however, the mine does not report production numbers for silver. In 2019, Newmont acquired Goldcorp Inc. and entered a joint venture with Barrick Gold in Nevada making it the largest gold mining company in the world now known as Newmont Goldcorp. In 2023, Newmont completed their acquisition of Australia based Newcrest Mining Limited expanding their gold and silver production as well as other commodities such as copper. In February 2024,

Newmont approved a portfolio optimization program that includes divesting six of their assets including CC&V and, late in 2024, announced an agreement with SSR Mining Inc. based in Denver, CO (Newmont, 2024b). Their corporate headquarters remain in Greenwood Village, Colorado. Newmont operates mines all over the world. In 2023, it was the largest gold mining company in the world (Investing News Network, 2024; Newmont, 2024a).

(6.5%), nickel (5.7%), and other commodities such as silver, lead, zinc, potash, platinum group elements, and cobalt (S&P, 2024). Lithium and copper had the largest exploration budget increases from 2022. Worldwide exploration budgets are forecasted to decrease in 2024 however, there is a large amount of uncertainty in this forecast (S&P, 2024).

A list of some select current exploration and/or development projects (in no particular order) in Colorado are included below. This list does not include all the projects located in the state. See the included references for more information.

- Slick Rock / West Slope projects (uranium/vanadium) (Anfield Energy, 2024);
- Dawson project (gold) (Zephyr Minerals, 2024);
- San Juan Silver project (silver and other base metals) (Hecla Mining, 2024);
- Silver Cliff (silver) (Viscount Mining, 2024);
- Klondike project (gold, silver, tellurium) (First Tellurium, 2024);
- Several projects in Western Colorado (uranium, vanadium) (Nuvemco, 2024);
- Revenue-Virginus project (silver and other metals) (Thorin Resources, 2024);
- Several projects in Western Colorado (uranium, vanadium) (Thor Energy, 2024);
- La Plata project (copper, gold, silver, and other metals) (Metallic Minerals, 2024);
- Patriot project (lithium) (United Lithium, 2024);
- Several projects in Colorado (uranium, vanadium) (Western Uranium & Vanadium, 2024); and
- Whirlwind (uranium, vanadium) (Energy Fuels, 2024).

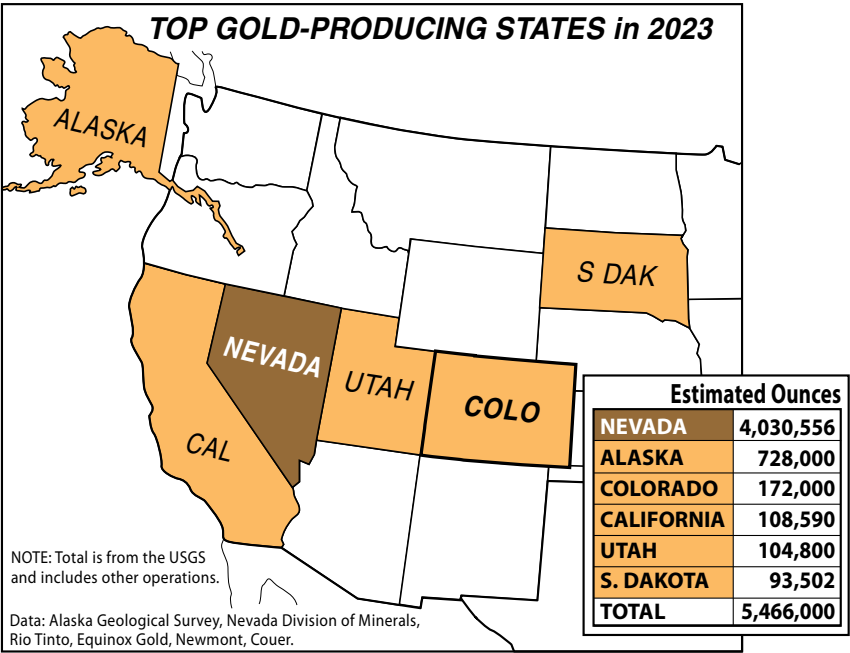


Figure 23. Major gold-producing states in 2023.

Sand and gravel aggregate operations recover a small amount of placer gold along some of Colorado’s rivers and streams including the South Platte, Arkansas, and Colorado rivers, as well as Clear Creek. Additionally, a few small lode gold mines operated by private individuals or small groups also produce small tonnages of high-grade gold and silver ore. As of December 2024, there are currently 38 active mining permits with gold listed as the primary mined commodity in the Colorado Division of Reclamation, Mining and Safety (DRMS) database (DRMS, 2024).

Other Exploration Activities

Worldwide exploration budget estimates for nonferrous metals decreased from \$13.10 billion in 2022 to \$12.76 billion in 2023 (S&P, 2024). Most of this estimated total budget is for exploration targeting gold (46.3%), copper (23.5%), lithium

Critical Minerals

As defined by the Energy Act of 2020 (White House, 2020), critical minerals are defined as minerals, elements, substances, or materials that (Nassar and Fortier, 2021) “(i) are essential to the economic or national security of the United States; (ii) the supply chain of which is vulnerable to disruptions (including restrictions associated with foreign political risk, abrupt demand growth, military conflict, violent unrest, anti-competitive or protectionist behaviors, and other risks throughout the supply chain); and (iii) serve an essential function in the manufacturing of a product (including energy technology-, defense-, currency-, agriculture-, consumer electronics-, and healthcare-related applications), the absence of which would have significant consequences for the economic or national security of the United States.” Furthermore, critical minerals do not include fuel minerals (e.g., uranium) and other materials such as sand, gravel, stone, pumice, cinders, and clay.

The final 2022 critical mineral list (Federal Register [FR], 2022) includes: aluminum, antimony, arsenic, barite, beryllium, bismuth, cerium, cesium, chromium, cobalt, dysprosium, erbium, europium, fluor spar, gadolinium, gallium, germanium, graphite, hafnium, holmium, indium, iridium, lanthanum, lithium, lutetium, magnesium, manganese, neodymium, nickel, niobium, palladium, platinum, praseodymium, rhodium, rubidium, ruthenium, samarium, scandium, tantalum, tellurium, terbium, thulium, tin, titanium, tungsten, vanadium, ytterbium, yttrium, zinc, and zirconium. More information about this list is included in Nassar and Fortier (2021). In 2023, the DOE also published a critical materials list for energy that includes: aluminum, cobalt, copper, dysprosium, electrical steel, fluorine, gallium, iridium, lithium, magnesium, natural graphite, neodymium, nickel, platinum, praseodymium, silicon, silicon carbide and terbium (DOE, 2023). As indicated in the “Uranium” section of this report, the DOE listed uranium as “near critical” in the short term (2020 to 2025). The current U.S. administration has taken further actions to secure critical minerals which are summarized on their website (see White House, 2024).

Minerals containing almost all the elements provided in the critical mineral list occur in Colorado. However, many of these may not occur in sufficient quantities to mine economically. Colorado is a known producer or past producer of many of the minerals/mineral materials provided in the critical minerals list especially (in no particular order) zinc, copper, tungsten, fluor spar, and vanadium. Also,

Colorado contains deposits of titanium, niobium, REE, and potentially lithium, as well as other critical minerals that may be economical to extract. Although not listed as a critical material in the short term by the DOE, Colorado contains abundant uranium deposits (see: <https://coloradogeologicalsurvey.org/energy/e-uranium/> for more information). For more on critical minerals in Colorado, see the CGS website: <https://coloradogeologicalsurvey.org/minerals/strategic-critical/>.

The CGS is currently working with the USGS to determine areas that may contain potential resources of critical minerals in Colorado. Between 2019 and 2024, the USGS hosted six critical mineral workshops that include mineral geologists from the USGS and from state geological surveys across the U.S. These workshops consist of regional teams that determine critical mineral focus areas, or areas where critical minerals are likely to be deposited, using a mineral system approach (Hofstra and Kreiner, 2020). During these workshops, participants select priority areas for future geological mapping and other geological/geophysical investigations related to critical minerals. The latest version of the critical mineral focus areas was recently published by the U.S. Geological Survey (Dicken and others, 2022) and is available here: <https://doi.org/10.5066/P9DIZ9N8>. An online interactive map with the focus areas for the U.S. is available here: <https://mrdata.usgs.gov/earthmri/focus-areas/>.

Priority areas are selected for future geological mapping and other geological investigations related to critical minerals. Geological mapping projects associated with these priority areas are funded through the USGS Earth Mapping Resources Initiative (EarthMRI). The CGS is currently working on two geological mapping projects and two sampling programs associated with EarthMRI. Additionally, the CGS has provided input with regards to the locations of high resolution airborne geophysical conducted recently by the USGS in Colorado (Grauch and others, 2023; USGS, 2024b). For more on the U.S. Geological Survey EarthMRI program, see: <https://www.usgs.gov/special-topics/earth-mri>. The USGS EarthMRI acquisitions interactive map viewer provides an overview of the current projects in Colorado and the entire U.S.: <https://ngmdb.usgs.gov/emri/#3/40/-96>. These projects include current CGS projects as well as geophysical surveys currently being conducted by the USGS in Colorado.

AGGREGATE and INDUSTRIAL MINERALS

Sand, Gravel, and Crushed Stone

In 2023, domestic construction aggregate (sand, gravel, and crushed stone) production accounted for ~33.5% of the total estimated value of U.S. nonfuel mineral production of \$105 billion (USGS, 2024a). Crushed stone was the leading nonfuel mineral commodity in 2023 with an estimated production value of \$24 billion (23% of the total estimated value) (USGS, 2024a). In 2023, the ~920 million tons of construction sand and gravel produced domestically was used primarily for Portland cement concrete aggregates (~43%), road base/coverings (~25%), construction fill (12%), and asphalt/other bituminous mixtures (~12%) (USGS, 2024a). Other uses include concrete products, filtration, golf course maintenance, plaster and gunite sands, railroad ballast, roofing granules and snow and ice control (USGS, 2024a). In 2023, ~1,500 million tons of crushed stone (e.g., limestone, dolomite, granite, and other rock types) was produced domestically. This material was used primarily for construction aggregate (70%) (especially for road construction and maintenance), cement manufacturing (20%), lime manufacturing (7%), agricultural uses (1%), and for other uses (USGS, 2024a). DRMS currently lists over 947 active permits for sand, gravel, aggregate, and aggregate-related quarries in Colorado (DRMS, 2024).

Colorado quarry operators produced 58.9 million short tons of aggregate (sand, gravel, and crushed stone) in 2023 (USGS, 2024c) (**Figure 24**). Colorado was the sixth leading producer of construction sand and gravel in the U.S. (USGS, 2024c) and the estimated 2024 production value was \$472 million for sand

and gravel and \$197 million for crushed stone. Average prices and production for sand and gravel and crushed stone are shown in **Figure 25** and **Figure 26**, respectively.

Colorado uses a large amount of aggregate to build and maintain infrastructure. The cost of aggregate to the user is highly dependent on aggregate transportation costs. Locating quarries close to population centers helps lower overall costs. However, residential and commercial development near an aggregate source can make permitting a new or expanding quarry a challenge. To help local governments identify potential sources of sand, gravel and quarry aggregates, the CGS published maps of sand, gravel, and quarry aggregate resources for Colorado Front Range counties which are available for download on our website (Schwochow and others, 1974; O’Keeffe and others, 2022).

Cement

Portland cement in Colorado is used primarily in the production of concrete. Concrete consists of a mixture of aggregates (e.g., sand, gravel, or crushed stone) mixed with water and cement. Concrete contains between about 60 and 75% coarse and/or fine aggregate (PCA, 2023). A common way to create Portland cement is by heating lime, clay, silica, alumina, iron, and other materials at high temperatures in a cement kiln which creates small round pellets (called “clinkers”) that are ground, mixed with limestone and gypsum, and used to make concrete. Several Portland cement plants operated in Colorado during 2023

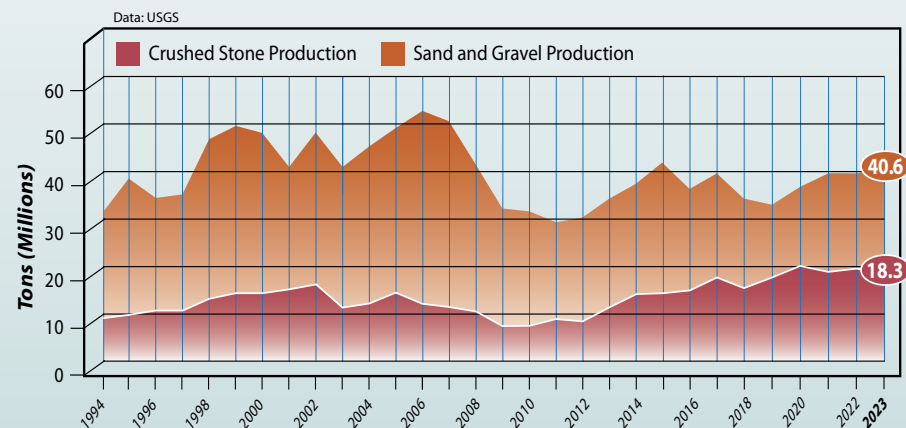


Figure 24. Aggregate production in Colorado, 1994–2023.

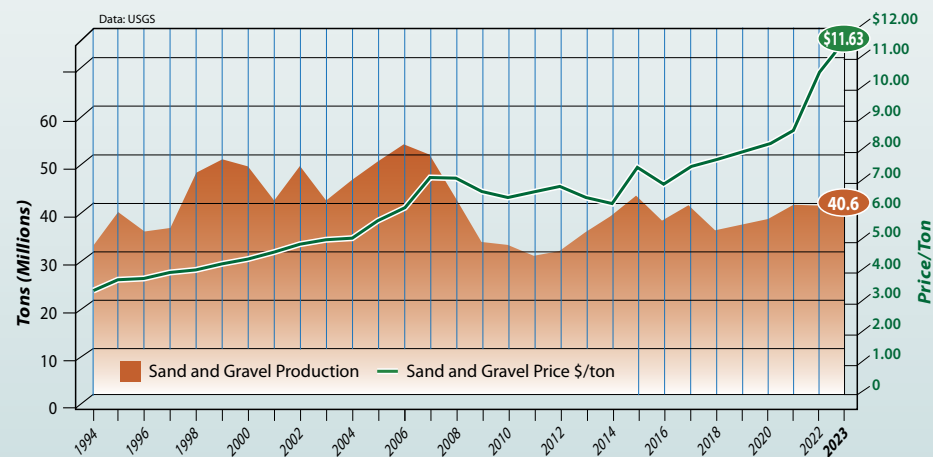


Figure 25. Price and production of sand and gravel aggregate in Colorado, 1994–2023 (sold or used by producers in the U.S.).

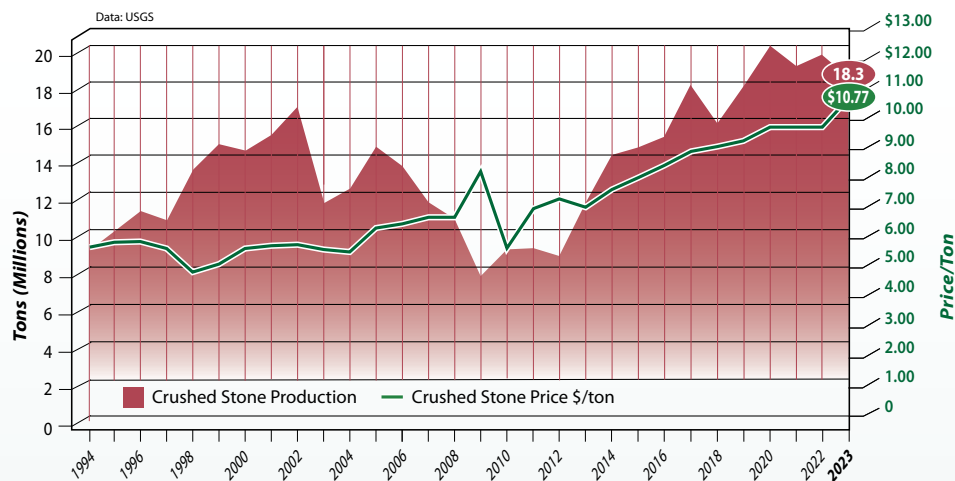


Figure 26. Price and production of crushed stone aggregate in Colorado, 1994–2023 (sold or used by producers in the U.S.).



Limestone in the Niobrara Formation near Lyons.

including: LafargeHolcim (US), Inc. (LafargeHolcim) in Florence, the GCC of America (GCC) plant in Pueblo, and CEMEX plant near Lyons. LafargeHolcim and GCC use Niobrara Formation as feed stock for their cement products. The Upper Cretaceous Niobrara Formation was deposited during a major marine transgression of the Western Interior Seaway around 82 to 89.5 million years ago (Sonnenberg, 2016). It is also a major source of oil and gas in the DJ Basin (Figure 1). Like the aggregate business, the production of cement is largely tied to the construction industry.

Clay and Shale

Clay is mined primarily in eastern Colorado along the Front Range and is used mostly to make brick and tile. Clay has been mined from the Laramie Formation, Dawson Arkose, and Denver Formation as well as the Dakota Group. DRMS records indicate that there are 39 active permits for clay and 4 for shale in Colorado (DRMS, 2024). Two brick companies currently operate in the Denver area: General Shale and Summit Brick Co. The Summit Brick Co. also operates a clay brick manufacturing facility in Pueblo. Production data for common clay and shale in Colorado is withheld for proprietary reasons. In 2017 and 2018 the production of common clay and shale was estimated at 297,000 short tons, respectively (O’Keeffe, 2024). The estimated average price of common clay was ~\$17.00 per metric ton in 2023 (USGS, 2024a).

Arcosa Lightweight (Arcosa) produces lightweight aggregate in Jefferson County from shale. They quarry Cretaceous Pierre Shale near their production facility which is then heated in a high temperature kiln at temperatures over 2,000 degrees Fahrenheit where it expands and hardens. This creates a ceramic lightweight aggregate, with a lower bulk density of natural aggregates, and is used in asphalt surface treatments, structural lightweight concrete, concrete masonry, geotechnical fill, and other applications (Arcosa, 2024).

Gypsum

In 2023, domestic crude gypsum production was 22 million tons, and the majority is used for agriculture, cement production, and wallboard/plaster products (USGS, 2024a). Gypsum mined in Colorado is used to produce wallboard, as an ingredient in cement production, a soil conditioner, and for other industrial uses. Information on gypsum production in Colorado is unavailable for proprietary reasons. There are currently 8 active mine permits associated with gypsum in Colorado (DRMS, 2024).

American Gypsum Co. operates a large quarry and fabrication plant for wallboard in Eagle County, near the town of Gypsum, and is the fifth largest producer of gypsum wallboard in North America (American Gypsum, 2024). In this area, gypsum (hydrated calcium sulfate) occurs in the Pennsylvanian Eagle Valley Evaporite which is composed of both gypsum and anhydrite (calcium sulfate) as well as halite (salt). These evaporite minerals were reportedly deposited in a landlocked marine trough where marine circulation and interchange was limited (Mallory, 1971). Near Eagle, Colorado, the evaporite interval can be 9,000 feet thick (Mallory, 1971). Gypsum for the cement industry and soil amendment is mined from the Munroe Quarry north of Fort Collins in Larimer County (Lien, 2024). Gypsum is also mined in Fremont County.

Sodium Bicarbonate (Nahcolite)

Sodium bicarbonate (more commonly known as baking soda) is primarily used in food preparation and baking, personal care products, pharmaceuticals, animal feed products, pool and water treatment, and other applications. Natural Soda, LLC. (Natural Soda), operates a nahcolite solution mine in Rio Blanco County. Nahcolite is the naturally occurring mineral of sodium bicarbonate (NaHCO_3). High grade nahcolite (greater than 80%) is recovered from the Parachute Creek Member of the Eocene Green River Formation in the Piceance Basin. The Green River Formation was deposited in an ancient lake, known as Lake Gosiute, which occupied this area from between ~52.5 to 47.5 million years ago (Smith and others, 2008). Nahcolite is present in the oil shale deposits where it occurs as disseminated aggregates, nodules, bedded units of disseminated brown crystals, and white crystalline beds associated with other minerals (e.g., dawsonite and halite) (USGS, 2009). Mine operators pump hot water down a well ~1,900 feet deep to dissolve the nahcolite. Other wells recover the sodium bicarbonate enriched solution and pump it to the surface where the solution cools and precipitates sodium bicarbonate which is further dried and prepared

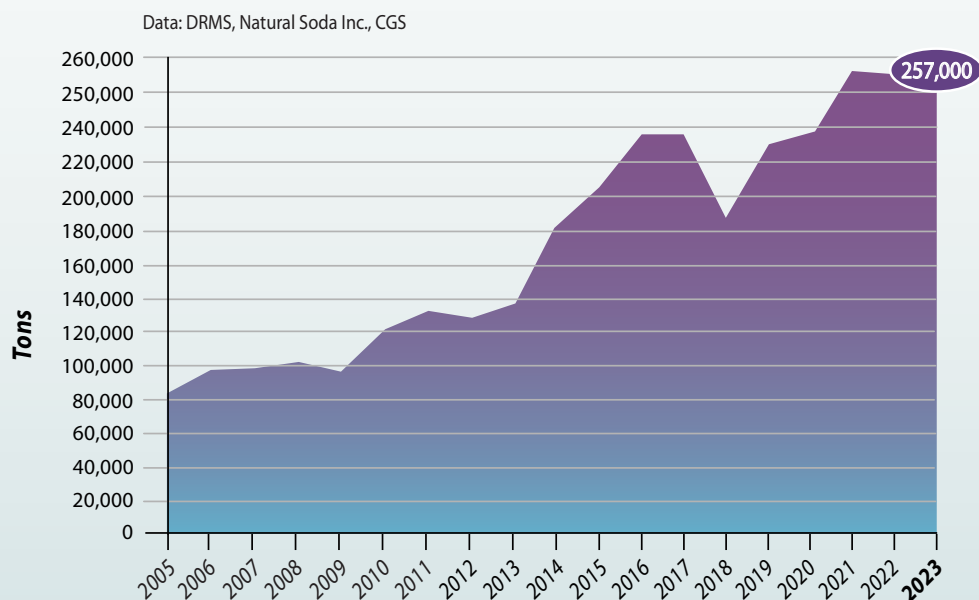


Figure 27. Estimated production of nahcolite in Colorado, 2005–2023.

to produce a commercial grade product (Hardy and others, 2003; Brownfield and others, 2010).

The USGS estimated that the Parachute Creek Member of the Eocene Green

River Formation in the Piceance Basin, Rio Blanco County, contains an estimated in-place resource of over 43 billion short tons of nahcolite over ~170,000 acres (USGS, 2009). Natural Soda's estimated production in 2020, 2021, 2022, and 2023 was: 231,562; 238,266; 257,000; 253,476; 257,000 tons, respectively (**Figure 27**) (O'Keeffe, 2024; Daily Sentinel, 2024).



Parachute Creek Member of the Eocene Green River Formation in the Piceance Basin.

Dimension and Decorative Stone

Dimension stone is any visually appealing rock that is quarried, cut, or shaped into useful forms. Colorado has many dimension stone and decorative stone producers who quarry sandstone, granite, marble, rhyolite, and alabaster (a form of gypsum) for use as dimension stone. DRMS lists over 23 active quarries for stone, marble, dimension stone, and quartzite (DRMS, 2024) which includes the marble quarry outside Marble, CO, as well as the Lyons Sandstone Quarry. Dimension stone is used to construct buildings, wall cladding or veneer, monuments, floor tiles, walkways (flagstone), landscaping features, and sculptures. Decorative stone is any type of rock that is used in its natural form for aesthetic purposes. In Colorado, various types of rock are mined locally for decorative use. In 2023, Texas, Wisconsin, Indiana, Vermont, and Georgia accounted for ~70% of U.S. production (USGS, 2024a). The rock types sold in the U.S. in 2023 by descending value included limestone (49%), granite (25%), sandstone (9%), dolomite (4%), and quartzite (4%), and other miscellaneous stones (9%) (USGS, 2024a).

INDUSTRIAL GASES (NON-ENERGY)

Carbon Dioxide

Naturally occurring carbon dioxide gas (CO₂) was produced in 2022 primarily from three areas in Colorado (in order of decreasing production volume): McElmo Dome in Montezuma County, Doe Canyon Deep in Dolores County, and Sheep Mountain Field in Huerfano County (ECMC, 2024a). The Rangely Field (Rio Blanco County) and the McCallum Field (Jackson County) have also produced CO₂ in the past. Kinder Morgan's (KM) McElmo Dome, in operation since 1983, and the Doe Canyon Deep units are the largest producers in Colorado. About 93% of the 2023 production of CO₂ in Colorado was from Montezuma County (ECMC, 2024a). According to KM, McElmo Dome is one of the largest known pure CO₂ fields in the world and contains over 20 trillion cubic feet of CO₂ with ~5 trillion cubic feet of recoverable CO₂ remaining to be produced (KM, 2024a). Most of the CO₂ is produced from the Mississippian Leadville Limestone at depths ranging from ~6,600 to 8,400 feet (Gerling, 1983). The source of the CO₂ is thought to be mainly from the *"thermal decomposition of calcite in carbonate reservoirs in the area, predominantly the Leadville Limestone, during a period of elevated geothermal gradients in early to mid-Tertiary time"* (Cappa and Rice, 1995). CO₂ is also produced from the Leadville Limestone at the Doe Canyon Deep facility (DOE, 2014; Shelton and others, 2016). CO₂ production at Sheep Mountain is from the Cretaceous Dakota Sandstone and Jurassic Entrada Sandstone (Roth, 1983).

CO₂ is produced from wells in a similar way to natural gas production. Most of the CO₂ is used during enhanced oil recovery (EOR), also known as improved or tertiary recovery (as opposed to primary or secondary recovery), in Texas and New Mexico. EOR techniques are implemented to increase the extraction of crude oil from mature oil fields and residual oil zones (KM, 2024b). CO₂ is used to extend the life of a well after the initial pressure in the well decreases. Other uses for CO₂ include welding gases, manufacture of dry ice, and in the food and beverage industry. In 2023, Colorado produced an estimated 292 billion cubic feet (Bcf) (ECMC, 2024a) at an average CGS calculated price of ~\$1.22 per thousand cubic feet (Mcf) and production value of ~\$356 million. **Figure 28** shows Colorado's estimated CO₂ production for the period 1994-2023.

Helium

In 2023, helium was primarily used for or in: specialty gases, manufacture of fiber optics, manufacture of semiconductors, magnetic resonance imaging, the aerospace industry, lifting gas (e.g., for lifting high-altitude equipment), welding,

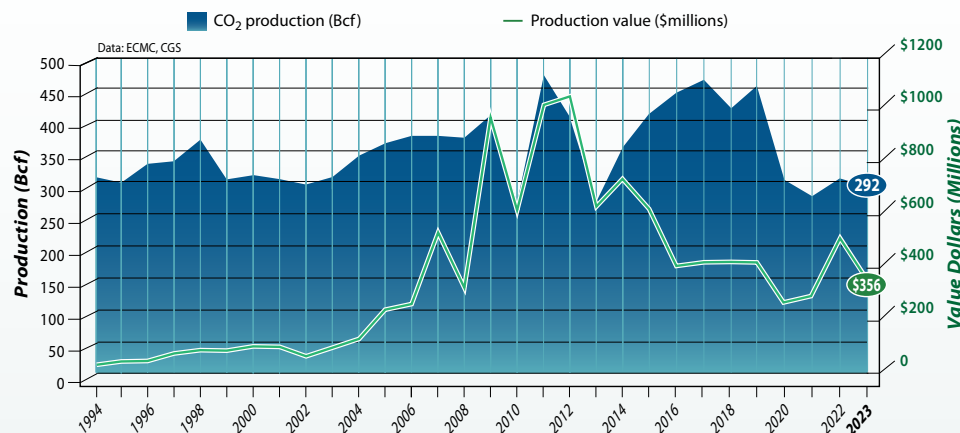


Figure 28. CO₂ production and estimated production value, 1994–2023.

leak detection, and other applications (USGS, 2024a). The estimated price for private industry grade-A helium in 2023 was ~\$390 per Mcf (USGS, 2024a). In 2024, the U.S. Bureau of Land Management completed the sale of the Federal Helium System to Messer, Inc (BLM, 2024).

The USGS estimates that the Rocky Mountain region of the U.S., which includes most of Colorado, contains ~148 Bcf of recoverable helium resources from known natural gas reservoirs (Brennan and others, 2021). The southeastern Colorado Ladder Creek gas plant facility located in Cheyenne Wells, Cheyenne County, produces Grade-A helium. Tumbleweed Midstream LLC (Tumbleweed) operates the Ladder Creek Helium Plant and gathering system. The helium plant is located south of Cheyenne Wells in Cheyenne County. The gathering system includes ~730 miles of pipeline, located in both Colorado and Kansas, and the plant has a current processing capacity of 40 million cubic feet (MMcf) per day which could be expanded to 50 MMcf per day. The plant also produces natural gas liquids and residue gas (Tumbleweed, 2024).

In 2015, Air Products and Chemicals, Inc. (Air Products) built a helium production facility in Doe Canyon. They extract most of the helium from a gas stream composed primarily of carbon dioxide. The plant has a capacity of ~230 MMcf per year and 2019 production is reportedly ~140 MMcf per year (Edison, 2021). Several companies continue to explore and develop helium properties in

Las Animas County. As reported over the last few years (O’Keeffe, 2022; 2023; 2024), Blue Star Helium Ltd. (Blue Star) continues to explore and develop their Voyager and Galactica/Pegasus helium properties in Las Animas County. More information is available on their website (Blue Star, 2024).

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