

HEADED WEST

The Challenges and Opportunities Facing
Exports of Wyoming Natural Gas to
Decarbonizing Western Markets



ACKNOWLEDGMENTS

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DEFINITIONS AND ABBREVIATIONS

Billion Cubic Feet Per Day (Bcf/d): A unit of measurement for natural gas

BLM: Bureau of Land Management

CARB: California Air Resources Board

CES: Clean Energy Standards

CCA: Washington's Climate Commitment Act

CCS or CCUS: Carbon capture and storage or carbon capture, use, and storage

Differentiated Natural Gas (DNG): Reduced carbon-intensity natural gas verified through monitoring and measurement.

DOI: U.S. Department of the Interior

EIA: U.S. Energy Information Administration

EPA: U.S. Environmental Protection Agency

Environmental, Social, and Governance (ESG): A set of performance indicators, primarily nonfinancial in nature, used by some companies in relation to investment practices.

FERC: Federal Energy Regulatory Commission

GHG: Greenhouse gas

Infrastructure Investment and Jobs Act (IIJA): Also referred to as the Bipartisan Infrastructure Law, the IIJA was passed by the United States Congress in November 2021 that appropriates funding for low-carbon technology development across the United States, among other items of spending.

Inflation Reduction Act (IRA): The IRA, passed by the United States Congress in August 2022, is a climate change mitigation bill that appropriates significant federal funding for investments in domestic energy production, with a goal of reducing domestic carbon dioxide emissions by roughly 40% by 2030.

LNG: Liquefied Natural Gas

Million Cubic Feet (MMcf): A unit of measurement for natural gas.

NDEP: Nevada Division of Environmental Protection

Net-zero: The objective of balancing greenhouse gas emissions with the amount removed from the atmosphere through carbon dioxide removal and other emissions mitigation technologies.

ODEQ: Oregon Department of Environmental Quality

PAW: Petroleum Association of Wyoming

Primacy: Primary enforcement authority is delegated by EPA to individual states, territories, or tribes, granting the jurisdiction authority to administer certain well classes in the Underground Injection Control (UIC) program in accordance with federal standards.

PUCO: Public Utility Commission of Oregon

Resource Management Plan (RMP): A land use plan that guides the management of resources and uses on public lands administered by the BLM. RMPs evaluate and establish goals and objectives for 15 to 20 years.

Renewable Natural Gas (RNG): A term used to describe biogas that has been upgraded for use in place of fossil natural gas. The biogas used to produce RNG comes from a variety of sources, including municipal solid waste landfills, digesters at water resource recovery facilities (wastewater treatment plants), livestock farms, food production facilities and organic waste management operations.

Renewable Portfolio Standards (RPS): Policies designed to increase the use of renewable energy sources for electricity generation.

Safe Drinking Water Act (SDWA): Authorizes EPA to set minimum standards to protect public water systems from contaminants.

Underground Injection Control (UIC): A program administered by the EPA under the SDWA that consists of six classes of injection wells based on the type and depth of injection activity.

WDEQ: Wyoming Department of Environmental Quality

WEA: Wyoming Energy Authority

WUTC: Washington Utilities and Transportation Commission

EXECUTIVE SUMMARY

Wyoming is a major producer and exporter of natural gas. Of the nation's 100 largest natural gas fields, 16 are located in the State, including the Pinedale Anticline and Jonah fields which rank within the top ten.¹ Wyoming is also among the top ten in both natural gas reserves² and marketed natural gas production,³ however, it only consumes about one-tenth of the natural gas it produces, with the remainder being exported to out-of-state customers.

Wyoming's natural gas production and exports have faced headwinds in recent years given the enactment of renewable and net-carbon neutral policies in California, Nevada, Oregon, and Washington—which comprise the majority of Wyoming's export markets. Such policies are likely to decrease demand for natural gas. Indeed, many of these policies are designed to do just that. In 2022, pipeline flow and production data show that approximately 80% of Wyoming's dry natural gas production flowed to the west.⁴ California—which is strongly focused on reducing its own natural gas production and consumption—is the largest importer of Wyoming natural gas.⁵

While Wyoming has ample production and pipeline capacity to export natural gas to states to the east and south, those options have been limited in recent years due to technological advancements, such as hydraulic fracturing, that unlocked prolific volumes of natural gas from shale formations across the United States. Referred to as the shale revolution, this development effectively pushed Wyoming natural gas out of markets to the east and directed it primarily to the west.

These state and regional challenges are amplified by decarbonization policies at the federal level and a renewed focus by federal agencies on climate impacts associated with natural gas production, transportation and usage. Some examples of these are, the U.S. Environmental Protection Agency's (EPA) proposed power plant rules,⁶ proposed tailpipe emissions standards,⁷ and recently finalized standards and emissions guidelines for oil and gas operations,⁸ and the Federal Energy Regulatory Commission's (FERC) filing and reporting requirements for natural gas rate schedules and tariffs.⁹

¹ *Wyoming State Profile and Energy Estimates*, U.S. ENERGY INFO. ADMIN. (EIA), <https://www.eia.gov/state/analysis.php?sid=WY> (May 18, 2023).

² *Ibid.*; *Natural Gas Reserves Summary*, EIA (Dec. 29, 2022), https://www.eia.gov/dnav/ng/ng_enr_sum_a_EPGO_r21_BCF_a.htm (data for 2021 shows Wyoming with 9th largest amount of wet natural gas reserves of 48 states).

³ *Rankings: Natural Gas Market Production, 2022*, EIA, <https://www.eia.gov/state/rankings/?sid=WY#series/47> (shows Wyoming as 9th largest marketed natural gas producing state in 2021) (last visited Jan. 25, 2024).

⁴ *International and Interstate Movements of Natural Gas by State for Colorado*, EIA, https://www.eia.gov/dnav/ng/ng_move_int_a2dcu_SUT_a.htm (data shows the rankings of Nebraska, Nevada, Oregon, Utah, and Wyoming) (Dec. 29, 2022).

⁵ *Ibid.*

⁶ 88 Fed. Reg. 33,240 (May 23, 2023).

⁷ 88 Fed. Reg. 29,184 (May 5, 2023).

⁸ *EPA's Final Rule for Oil and Natural Gas Operations will Sharply Reduce Methane and Other Harmful Pollution*, U.S. EPA (Dec. 2, 2023), <https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-operations/epas-final-rule-oil-and-natural-gas>.

⁹ 87 Fed. Reg. 71511 (2022).

Wyoming is also impacted by federal low-carbon policies focused on the production of fossil fuels, such as leasing moratoriums on federally owned lands. Wyoming produces more natural gas from leases on federally owned land than any other state and 77% of the State's natural gas production is on federal lands leased by energy companies.¹⁰

All of these factors are separately buttressed by investor interest in companies that prioritize environmental stewardship including the use of lower carbon fuels. These preferences are being implemented, in part, through Environmental, Social and Governance (ESG) policies and goals.

While these challenges seem daunting, they have the potential to create opportunities for Wyoming natural gas production and exports. For instance, Wyoming natural gas has relatively low methane and carbon intensity in comparison to that which is produced in other states west of the Mississippi River. Wyoming producers are also increasing the proportion of Differentiated Natural Gas (DNG), which is reduced carbon-intensity natural gas verified through monitoring and measurement. DNG creates market opportunities for Wyoming natural gas producers. In particular, these attributes may enable Wyoming natural gas to not only preserve its market share, but to expand it in the four key western states of California, Nevada, Oregon and Washington, while creating additional market opportunities elsewhere in the region. These opportunities are further supported by Wyoming's leadership in the related technological areas of carbon capture, use and storage (CCUS) and hydrogen

produced from natural gas with CCUS. Given the critical role that oil and natural gas production plays in Wyoming's economy, all of these factors are of vital importance to the State.

According to the Petroleum Association of Wyoming (PAW), in 2022, oil and natural gas production generated approximately \$2.72 billion for the State in the form of property taxes, severance taxes, federal royalties, federal lease revenues, state royalties, sales and use taxes, and conservation mill levies.¹¹ Additionally, in 2021, Wyoming's oil and gas industry directly employed more than 20,000 people with an annual payroll of \$3.6 billion.¹² These benefits may be imperiled if Wyoming's natural gas export market continues to enact policies that are designed to reduce the consumption of natural gas while failing to consider the inherent low-methane intensity attributes when it is produced in Wyoming.



¹⁰ Wyoming 2022 federal natural gas production reported by the *Office of Natural Resource Revenue* divided by the total 2022 natural gas production in the state reported by the *Wyoming Oil and Gas Conservation Commission* (WOGCC).

¹¹ *Oil and Gas Facts and Figures 2023*, PETROLEUM ASS'N OF WYO. (PAW), <https://pawyo.org/facts-figures-2023/> (last visited Jan. 25, 2024).

¹² *Ibid.*

THE NATURAL GAS INDUSTRY IN WYOMING

OVERVIEW OF WYOMING'S NATURAL GAS INDUSTRY AND ITS IMPORTANCE TO WYOMING'S ECONOMY

Natural gas plays a vital role in both Wyoming's energy industry and economy. In 2022, there were 17,800 producing natural gas wells in the State.¹³ Wyoming also had 25 operating gas plants processing nearly 97% of the State's gas production, most of which is exported via the 30,000 miles of pipelines located in all of Wyoming's 23 counties.¹⁴ Several of these pipelines converge at a major interstate natural gas trading hub located in Opal.¹⁵

While still an essential part of Wyoming's economy, revenue from the natural gas industry has decreased in recent years due to declining production. From 2006 through 2021, Wyoming's marketed natural gas production averaged 4.9 Bcf/d, peaking at 6.4 Bcf/d in 2009, and declining to a low of 2.8 Bcf/d in 2022.¹⁶ The latest EIA natural gas monthly data shows that Wyoming's production has continued to decline (Figure 1).¹⁷



¹³ *Ibid.*

¹⁴ *Ibid.*

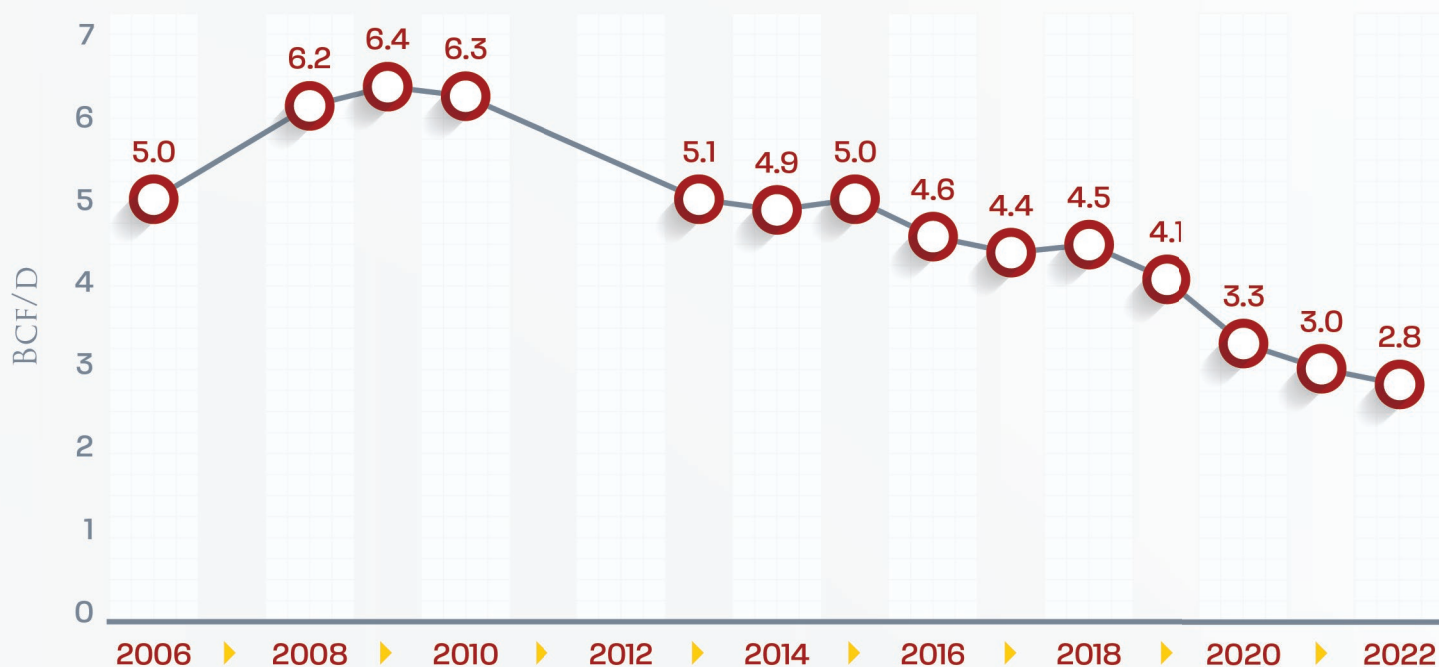
¹⁵ *Wyoming State Profile and Energy Estimates*, EIA, <https://www.eia.gov/state/analysis.php?sid=WY> (May 18, 2023).

¹⁶ *Wyoming Natural Gas Marketed Production*, EIA (Dec. 29, 2023), <https://www.eia.gov/dnav/ng/hist/n9050wy2a.htm>.

¹⁷ *Ibid.*

FIGURE 01

WYOMING MARKETED NATURAL GAS PRODUCTION (BCF/D)



Data Sources: Wyoming Natural Gas Marketed Production (Million Cubic Feet)¹⁸

Wyoming's oil and natural gas drilling activity has also declined. The rig count peaked in 2006 and went to zero (i.e., no active rigs) in 2020 during the pandemic. Although Wyoming's rig count has somewhat rebounded, it remains at historically low levels (Figure 2).¹⁹

While Wyoming's marketed natural gas production averaged 2.8 Bcf/d in 2022, its consumption averaged only 0.3 Bcf/d. The remaining ~2.5 Bcf/d was exported to western markets.²¹ With nearly all of Wyoming's natural gas exports currently moving to California, Oregon, Nevada and Washington, it is important for Wyoming policymakers to understand the risk to its exports posed by the policies enacted in those states.

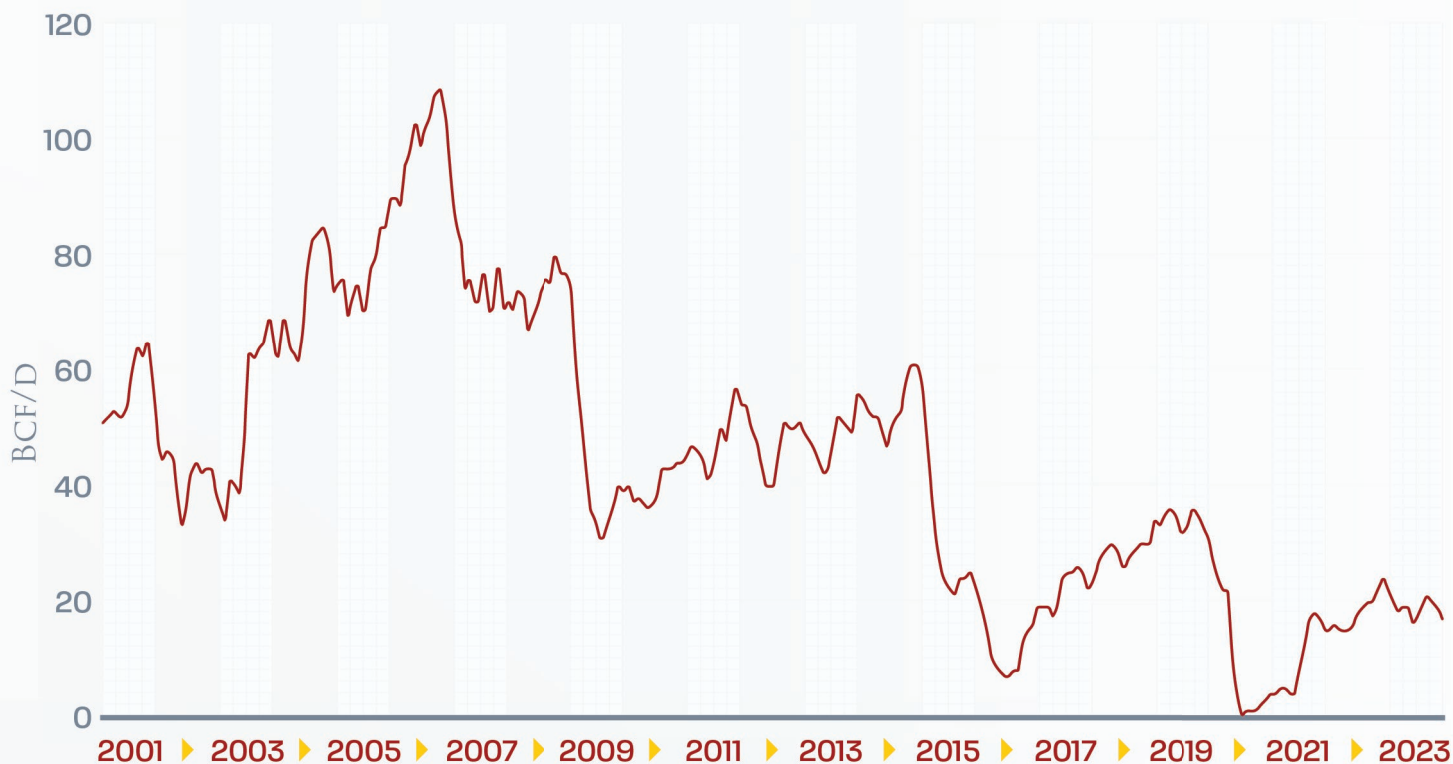
With nearly all of Wyoming's natural gas exports currently moving to California, Oregon, Nevada and Washington, it is important for Wyoming policymakers to understand the risk to its exports posed by the policies enacted in those states.

¹⁸ Wyoming Natural Gas Marketed Production, EIA (Dec. 29, 2023), <https://www.eia.gov/dnav/ng/hist/n9050wy2a.htm> (internally generated graph using EIA data).

¹⁹ Baker Hughes, <https://rigcount.bakerhughes.com/na-rig-count> (last visited Jan. 25, 2024).

FIGURE 02

AVERAGE MONTHLY RIG COUNTS (2001-2023)



Data Sources: Wyoming Natural Gas and Oil Rig Count²⁰



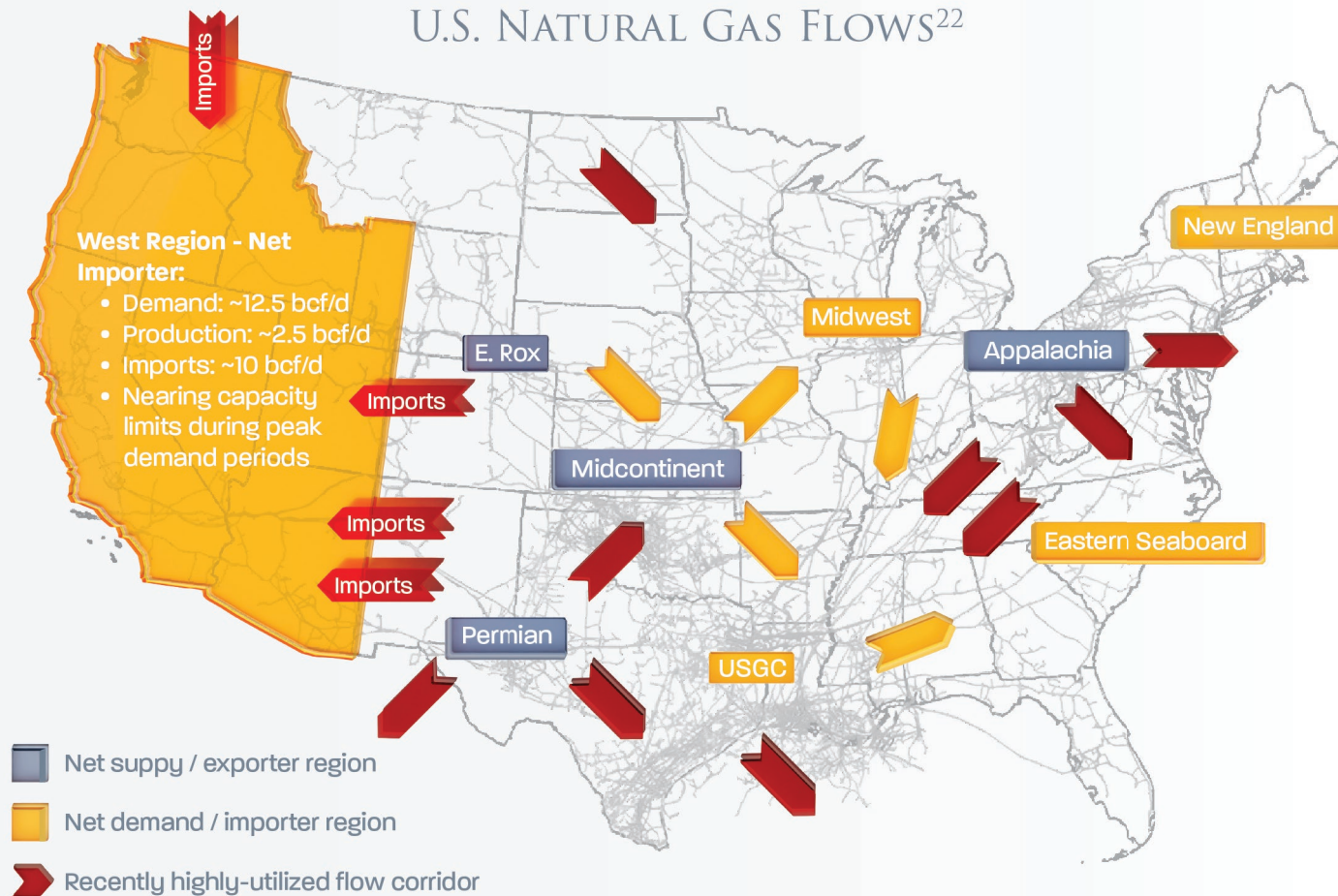
THE SHALE REVOLUTION AND ITS IMPACT ON WYOMING'S EXPORT MARKETS

Historically, the majority of natural gas produced in Wyoming was exported to the Midwest and West Coast markets through interstate pipelines that cross into Utah, Nebraska, Colorado, and Montana. However, as the shale revolution opened up new exploitable plays elsewhere in the United States, Wyoming's natural gas exports were displaced and now move west to California, Washington, Oregon and Nevada (Figure 3).

²⁰ Baker Hughes, <https://rigcount.bakerhughes.com/na-rig-count> (Internally generated graph using Baker Hughes monthly average Rig count data for Wyoming) (last visited Jan. 25, 2024).

²¹ *Natural Gas Delivered to Consumers in Wyoming (Including Vehicle Fuel)*, EIA (Dec. 29, 2023), <https://www.eia.gov/dnav/ng/hist/n3060wy2m.htm> (calculated employing EIA Wyoming data).

FIGURE 03

U.S. NATURAL GAS FLOWS²²

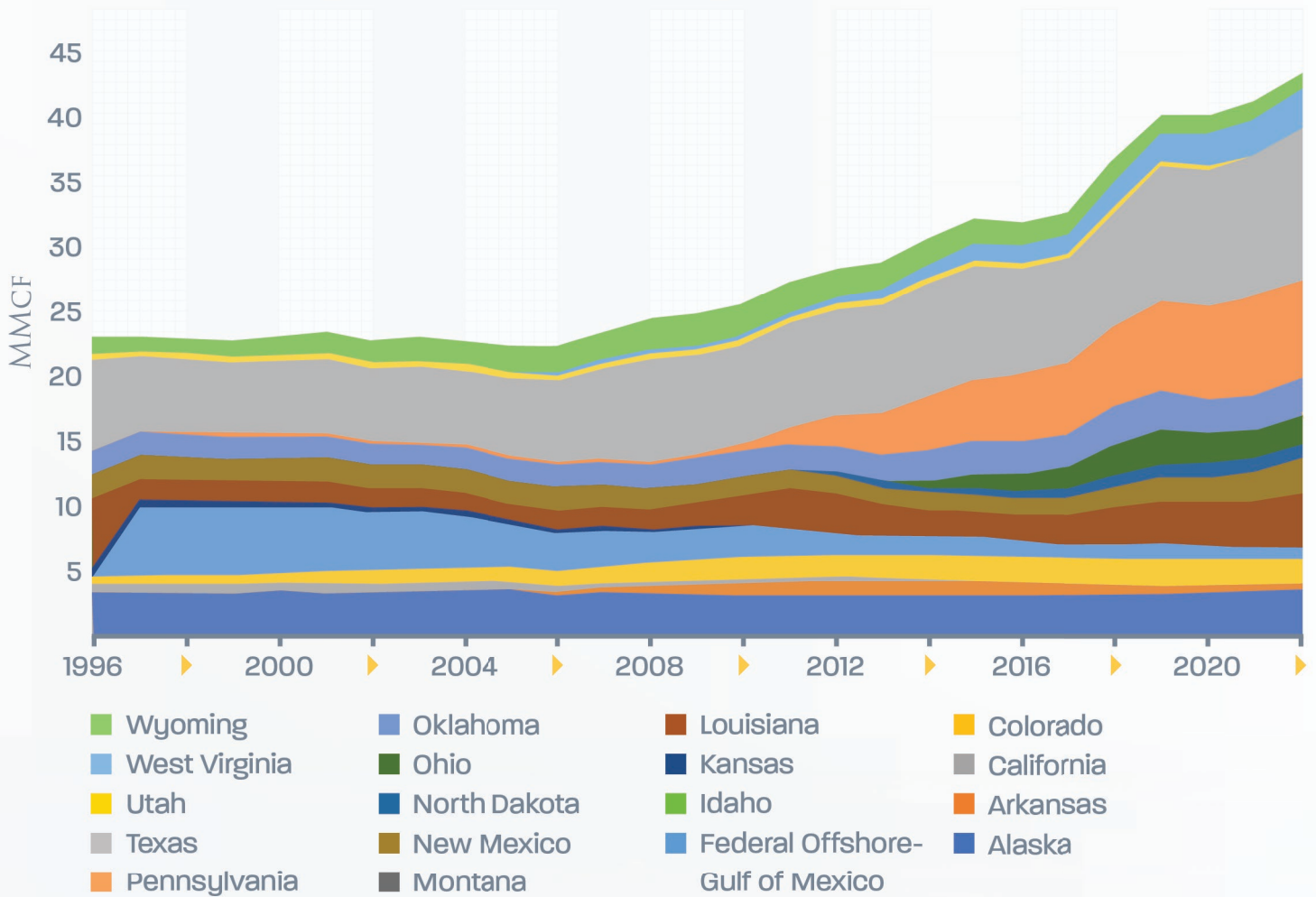
The shale revolution not only precipitated this dramatic shift in the geographical concentration of natural gas production across the United States, but it also led to large increases in the natural gas production occurring outside Wyoming starting in 2010 (Figure 4).

Despite having existing pipeline capacity to export Wyoming natural gas to the east, this capacity is being underutilized due to competition from growing shale production in areas such as the Bakken, Marcellus, and Permian Basin. This increase in shale production has reduced Wyoming's competitive advantage in eastern markets resulting in lower pricing on Wyoming natural gas flowing to the east than Wyoming natural gas flowing to the west.

²² Illustration of map showing gas flow in the U.S., from *Rockies Petroleum Conference PowerPoint*, PUREWEST (2023), following p.6.

FIGURE 04

U.S. WITHDRAWALS OF NATURAL GAS (MMCF)



Data Sources: U.S. Total Gross Production of Natural Gas (MMcf)²³

²³ Natural Gas Monthly, EIA (Dec. 29, 2023), http://www.eia.gov/oil_gas/natural_gas/data_publications/natural_gas_monthly/ngm.html (Internally generated graph using data from EIA).

WYOMING'S ADVANTAGE IN LOW-METHANE INTENSITY NATURAL GAS

Wyoming is a leader in the production of low-methane intensity natural gas, a lower-carbon attribute that should be desirable to consumers in states like California that are focused on addressing carbon dioxide emissions from fossil fuel production and usage. According to a 2021 study by researchers at the Georgia Institute of Technology, Wyoming natural gas has the lowest “[e]stimated consumption-normalized production-stage methane emissions” of any state in the western United States (Figure 8).²⁴

This is not surprising as Wyoming has long been recognized as a leader in regulating air emissions, including being an early mover among states in addressing fugitive methane emissions. In 2021, Jonah Energy announced its sole status of Gold Standard ranking in the United Nations-sponsored Oil and Gas Methane Partnership 2.0.²⁵ Also in 2021, PureWest Energy LLC, Wyoming's largest natural gas producer, became the first company in the United States to provide a carbon-neutral DNG offering to customers.²⁶






²⁴ D. Burns et. seq., *Attribution of Production-Stage Methane Emissions to Assess Spatial Variability in the Climate Intensity of US Natural Gas Consumption*, 2021 Env't Rsch. Letter 16 044059 (April 8, 2021), <https://iopscience.iop.org/article/10.1088/1748-9326/abef33> (citing Figure 3); see also, Ellie Potter, “States Looking to Decarbonize May Need to Weigh Their Gas’ Origin – Study,” S&P GLOBAL MARKET INTELLIGENCE (March 18, 2021), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/states-looking-to-decarbonize-may-need-to-weigh-their-gas-s-origin-8211-study-63228122>.

²⁵ Joy Ufford, Jonah, PureWest Both Reach Natural-Gas Milestones, PINEDALE ROUNDUP (Nov. 18, 2021), <https://pinedaleroundup.com/article/jonah-purewest-both-reach-natural-gas-milestones>.




²⁶ Private Wyoming Gas Producer Announces First US Carbon-Neutral RSG Offering, HART ENERGY (Oct. 7, 2021), <https://www.hartenergy.com/exclusives/private-wyoming-gas-producer-announces-first-us-carbon-neutral-rsg-offering-196627>.

FIGURE 09

Topic	Projects and Pilots
Producer only	     
Producer-utility	        
Producer-LNG	      
Producer-midstream	 

Data Sources: Multiple DNG Partnerships Across Different Stakeholders in the Gas Industry³⁰

FIGURE 10

	Standard Name	Continuous monitoring required?	Specific technology required?	Independent third-party assessment	Performance rating (low to high)	Funding Model
PROJECT CANARY	TrustWell Responsible Gas	✓	✓	✗	Three scoring levels: Silver, Gold, Platinum	For-profit
	MiQ Standard	✗	✗	✓	Six grades from A-F	Not-for-profit
	EO100™ for Responsible Energy Development	✗	✗	✓	Three levels of performance targets (PTs): PT1, PT2, and PT3	Not-for-profit
	ISO 14001:2015	✗	✗	✓	Not applicable	Not-for-profit

Data Sources: DNG Certification Approaches³¹

³⁰ *Responsibly Sourced Gas: Cleaner, Greener and Here to Stay* (extract), Wood Mackenzie (Oct. 2021).

³¹ *Ibid.*

DNG produced in Wyoming and elsewhere competes with Renewable Natural Gas (RNG) in states such as California that are trying to shift away from fossil fuels. DNG is accurately deemed to be a fossil fuel, whereas RNG is a biogas that comes from non-fossil fuel sources.³² As a result, RNG qualifies under the federal Renewable Fuel Standard program and California's Low Carbon Fuel Standard (LCFS).³⁴

WYOMING'S EFFORTS IN CCUS AND HYDROGEN

In addition to the lower methane intensity demonstrated by Wyoming natural gas producers, other technologies can further reduce net emissions from the production and consumption of natural gas, particularly CCUS and hydrogen.

CCUS and Wyoming's CCUS Legal and Regulatory Frameworks

CCUS can be applied to any point source gas stream, including:

- 1 At natural gas processing facilities in which CO₂ is released;
- 2 When natural gas is combusted to produce heat and/or electricity; and
- 3 When natural gas is converted to hydrogen.³⁵

The importance of energy to Wyoming's economy has prompted the State to become a leader in CCUS development and deployment.³⁶ The State's efforts to be at the forefront of CCUS development include participation in DOE-funded and NETL-supported Carbon Storage Assurance Facility Enterprise (CarbonSAFE) initiative projects.³⁷ To date, four CarbonSAFE projects are being headed-up by the University of Wyoming School of Energy Resources (UW/SER):

- 1 The Sweetwater Carbon Storage Hub, a Phase III study of a commercial-scale carbon capture project in formations just east of the Moxa Arch;

³² *Renewable Natural Gas*, U.S. ENV'T PROT. AGENCY (EPA), <https://www.epa.gov/lmop/renewable-natural-gas> (Aug. 3, 2023).

³³ *Renewable Fuel Standards*, EPA, <https://www.epa.gov/renewable-fuel-standard-program> (Jan. 18, 2024).

³⁴ *Low-Carbon Fuel Standard (LCFS) Guidance 19-05*, California Air Resources Board (Oct. 2019), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_19-05.pdf.

³⁵ *Point Source Carbon Capture*, NAT'L ENERGY TECH. LAB'Y (NETL), <https://www.netl.doe.gov/carbon-management/carbon-capture> (last visited Jan. 25, 2024).

³⁶ *Wyoming CarbonSAFE Project*, Univ. of Wyo., <https://www.uwyo.edu/cegr/research-projects/wyoming-carbonsafe.html> (last visited Jan. 25, 2024).

³⁷ *CarbonSAFE*, NETL, <https://netl.doe.gov/node/7677> (last visited Jan. 25, 2024).

- 2 Wyoming CarbonSAFE Phase III, a commercial-scale storage complex feasibility study adjacent to Dry Fork Station near Gillette, Wyoming;
- 3 Hermiston Oregon Carbon Assurance Facility Enterprise (HERO Basalt CarbonSAFE) project, a commercial-scale carbon capture and storage feasibility study at a Wyoming-sourced natural gas plant in Hermiston, Oregon; and
- 4 The Williams Echo Springs CarbonSAFE Storage Complex Feasibility Study, a commercial-scale carbon capture project in the eastern Great Divide sub-basin of the Green River Basin.³⁸

Additionally, Wyoming's CCUS legal and regulatory frameworks are particularly helpful in supporting CCUS projects that can further the carbon management of Wyoming natural gas during production and processing, as well as demonstrate the merit of CCUS for other states that use it, such as California.

Wyoming statutes and regulations comprehensively address CCUS projects in a manner that protects human health and the environment while providing a favorable investment environment for project developers. Many of those laws were enacted more than a decade ago. More recently, in 2020 EPA granted Wyoming, through the Wyoming Department of Environmental Quality (WDEQ), primacy under Class VI of the Safe Drinking Water Act's (SDWA) Underground Injection Control (UIC) program. This allows Wyoming to permit wells for CO₂ in geologic storage pursuant to EPA's UIC program. Also, Wyoming Senate File 0047 (SF47), an act relating to the long-term stewardship of CO₂ in geologic storage, passed the Wyoming Legislature and was signed into law by Governor Mark Gordon on March 21, 2022. SF47 adds to Wyoming's existing robust statutory and regulatory regime for CCUS by creating a framework for the long-term stewardship of CO₂ in geologic storage as shown in Table 1.

TABLE 01

Topic	Citation
Pore space ownership	Wyo. State § 34-1-152
CO ₂ ownership	Wyo. State § 34-1-153(a)
Liability for injected CO ₂	Wyo. State § 34-1-153(b)
Permitted requirements	Wyo. State § 34-11-313
Unitization of pore space	Wyo. State §§ 35-11-314-317
Roles of the injector	Wyo. State § 34-11-318(b) and (c)
Long-term stewardship	Wyo. State § 35-11-319
Trust fund for MRV	Wyo. State § 35-11-320
Resolution of conflicts between the mineral and storage estates	Wyo. State § 30-5-501
Certification of CO ₂ stored via EOR	Wyo. State § 30-5-502

Data Sources: Wyoming CCUS Statutes

³⁸ Dustin Bleizeffer, *Feds Award University of Wyoming \$11.2M to Study Underground CO₂*, WYOFIELD (Nov. 22, 2023), https://wyofile.com/feds-award-university-of-wyoming-11-2m-to-study-underground-co2-storage/?utm_source=WyoFile&utm_campaign=59ed8184dd-EMAIL_CAMPAIGN_2023_10_05_10_28_COPY_01&utm_medium=email&utm_term=0_cedf90c244-%5BLIST_EMAIL_ID%5D.

³⁹ Jeff St. John, *Which States will Win Out on \$9.5B in Federal Clean Hydrogen Funding?*, CANARY MEDIA (Feb. 24, 2022), <https://www.canarymedia.com/articles/hydrogen/which-states-will-win-out-on-9-5b-in-federal-clean-hydrogen-funding>.

Hydrogen

Another potential market for Wyoming natural gas is as a feedstock for the production of low-carbon hydrogen. Near-term opportunities exist to drive investment in this sector. The Infrastructure Investment and Jobs Act (IIJA) provides \$9.5 billion in funding for a clean hydrogen research and development program. Eight billion dollars are earmarked for developing at least four clean hydrogen hubs in the United States. The law specifies at least one of the hubs use nuclear energy and at least one employ fossil fuels with CCS.³⁹ Wyoming filed a joint application with Colorado, New Mexico and Utah for IIJA funds to build a regional Western Interstate Hydrogen Hub, and in October 2023, DOE announced it is granting \$7 billion to fund seven hydrogen hubs.⁴⁰ Unfortunately, the Western Interstate Hydrogen Hub was not included in the final list.⁴¹

The remaining \$1.5 billion of the IIJA funding for clean hydrogen research goes to grants and research and development, of which Wyoming received \$10 million (\$5 million of which was cost shared by private and state sources) to conduct a pilot-scale field demonstration of hydrogen production using natural gas and produced water from oil and gas operations. In addition to the work Wyoming has already done with CO₂ permanent storage sites, relatively low-carbon natural gas production, wind energy, an advanced nuclear demonstration plant, and extensive energy infrastructure (pipelines, electrical transmission, rail, etc.), the State is also in a unique position to benefit from a hydrogen economy.

While widespread use of hydrogen as an energy carrier is a longer-term play than the promotion of DNG, a Wyoming hydrogen sector can build on a foundation of DNG, other energy resources, and related infrastructure. In addition to being a leading energy producer, the State hosts a robust and expansive rail system which could be used to transport low-carbon-footprint ammonia.⁴² Given the nascent state of the hydrogen industry, blends of up to 20% hydrogen could be transported through use of the State's extensive natural gas pipeline network.⁴³ This would be a viable option for states, such as Washington, where they have been testing the use of blended hydrogen and natural gas for electricity generation from a natural gas-fired power plant.⁴⁴

⁴⁰ Biden-Harris Administration Announces \$7 Billion for America's First Clean Hydrogen Hubs, Driving Clean Manufacturing and Delivering New Economic Opportunities Nationwide, U.S. Dep't of Energy (Oct. 13, 2023), <https://www.energy.gov/articles/biden-harris-administration-announces-7-billion-americas-first-clean-hydrogen-hubs-driving>.

⁴¹ Greg Johnson, *Biden's DOE Denies Wyoming's Pitch for \$1.25 Billion Hydrogen Hub*, COWBOY STATE DAILY (Oct. 13, 2023), <https://cowboystatedaily.com/2023/10/13/bidens-doe-denies-wyomings-pitch-for-1-25-billion-hydrogen-hub/>.

⁴² Numerous major railroads operate in Wyoming, including the BNSF Railway Company and the Union Pacific Railroad. List of companies located at Wyoming Railroads and Related Links, Wyoming Department of Transportation: available at Wyo. Dep't of Transp., https://www.dot.state.wy.us/home/engineering_technical_programs/railroads/rr_related_links.html (last visited Jan. 25, 2024).

⁴³ *Federal Hydrogen Pipeline Regulatory Authorities: Hearing on Federal Hydrogen Pipeline Regulatory Authorities Before the U.S. Senate Committee on Energy & Natural Resources*, 117th Cong. (2022) (testimony of Dr. Holly Krutka Executive Director, School of Energy Resources, University of Wyoming) <https://www.energy.senate.gov/services/files/634AB478-04F4-4B52-9B4F-6DD52BE5E19B>.

⁴⁴ *Lower Carbon Fuels*, PUGET SOUND ENERGY, <https://www.pse.com/en/pages/Lower-Carbon-Fuels> (last visited Jan. 25, 2024).

⁴⁵ *Hydrogen in Transportation and Mobility*, HYDROGEN FORWARD, <https://www.hydrogenfwd.org/wp-content/uploads/2021/03/Transportation.pdf> (last visited Jan. 25, 2024).

Other options include the use of hydrogen for heavy transportation, aviation, and marine transport (potentially with ammonia). Wyoming low-methane intensity natural gas converted to hydrogen paired with CCUS, could yield a low-carbon energy carrier that would prove particularly helpful for these difficult-to-decarbonize sectors.⁴⁵

To these ends, Wyoming is advancing several initiatives related to the production and utilization of hydrogen, including, but not limited to, blue hydrogen, a low-carbon form of hydrogen production where hydrogen is produced from natural gas or coal with the resulting CO₂ emissions being captured and stored, and carbon-free green hydrogen which is produced through electrolysis that is powered by renewable energy.⁴⁶

On March 17, 2021, for example, the Wyoming Energy Authority (WEA) opened a request for proposals for a hydrogen pilot project. The following three finalists were approved to receive funds for the design and/or construction of a pilot project demonstrating green or blue hydrogen production and use:⁴⁷

- 1 Black Hills Energy, Wyoming Hydrogen Demonstration Pilot Project – “a feasibility study for a natural gas-fed blue hydrogen gas generator with carbon capture; a green hydrogen gas generator fed with renewable energy and water; and a conceptual engineering assessment of equipment modifications of GE LM6000 combustion turbines to accommodate blended fuel mix of hydrogen and methane.”⁴⁸
- 2 Williams Companies, Williams Southwest Wyoming Hydrogen Hub – “a feasibility study in partnership with the University of Wyoming to evaluate water access and compatibility as well as asset integrity in support of green hydrogen production and transport in the vicinity of Wamsutter and Opal, Wyoming.”⁴⁹
- 3 Jonah Energy, Green Hydrogen through Power to Gas Study – “a plan in partnership with National Renewable Energy Laboratory (NREL) to create ‘green’ hydrogen and renewable natural gas through biomethanation.”⁵⁰

In addition, UW/SER established a Hydrogen Energy Research Center (H₂ERC) in 2022.⁵¹ UW/SER and H₂ERC supported the Williams Southwest Wyoming Hydrogen Hub project which was one of the three chosen proposals for the WEA hydrogen pilot project.

⁴⁶ MADELEINE LEWIS, EUGENE HOLUBNYAK, AND SCOTT QUILLINAN, HYDROGEN DEVELOPMENT WITH CCS IN WYOMING (University of Wyoming School of Energy Resources, Center for Energy Regulation and Policy Analysis, 2023). (Available at https://www.uwyo.edu/ser/research/centers-of-excellence/energy-regulation-policy/_files/h2-development-with-ccs-in-wyo.pdf).

⁴⁷ Cooper McKim, *Three Companies Awarded Funds to Develop Hydrogen-Related Projects*, WYO. PUBLIC MEDIA (July 23, 2021) <https://www.wyomingpublicmedia.org/natural-resources-energy/2021-07-23/three-companies-awarded-funds-to-develop-hydrogen-related-projects>.

⁴⁸ *Awardees for the Hydrogen Pilot Project*, WYO. ENERGY AUTH. (July 23, 2021), <https://web.archive.org/web/20210901232921/https://www.wyoenergy.org/news/awardees-for-the-hydrogen-pilot-project/>

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

⁵¹ *Hydrogen Energy Research Center*, UNIV. OF WYO., <https://www.uwyo.edu/ser/research/centers-of-excellence/hydrogen-energy-research/index.html> (last visited Jan. 25, 2024).

DECARBONIZATION AND RELATED POLICIES

IMPACTING THE PRODUCTION AND EXPORT OF WYOMING NATURAL GAS

While there may be opportunities for continued Wyoming natural gas consumption from DNG, CCUS deployment, and clean hydrogen production, there are also challenges, many of which stem from policy and regulatory actions at the national level and in the states to which Wyoming exports its gas.

U.S. FEDERAL POLICIES

The production and export of Wyoming natural gas is subject to a variety of federal energy and environmental policies from both the executive and legislative branches.

Executive Branch

The Biden Administration has made reducing fugitive methane emissions from natural gas production a priority. Several executive branch policies aimed at reducing the greenhouse gas (GHG) impacts of natural gas are highlighted below.

Bans or Restrictions on Federal Land Production

The BLM released the Rock Springs Draft Resource Management Plan (RMP) for public comment on August 18, 2023. The Rock Springs planning area includes 3.6 million acres of BLM-managed surface and approximately 3.7 million acres of BLM-administered minerals. The current RMP designates a little over 3 million acres as open for fluid mineral leasing, however, under the preferred alternative, BLM would place most of the area, approximately 2.2 million acres, off-limits to oil and natural gas development. If the BLM selects the preferred alternative (Alternative B) for the final RMP, it would have significant negative implications for Wyoming's natural gas production.



Revised Leasing Policies

Upon taking office in January 2021, one of the initial actions of the Biden Administration was to ban oil and natural gas leasing on federal lands.⁵² This was done in response to Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, which directed the Department of the Interior (DOI) to prepare a report of the federal oil and gas leasing program and recommendations to update and improve it.⁵³ The Report was released in November 2021 (DOI Report),⁵⁴ and the first BLM lease sale in Wyoming after the ban went into effect took place in June 2022. The next sale took place a year later in June 2023. The Inflation Reduction Act (IRA) directed BLM to resume holding quarterly lease sales in accordance with the Mineral Leasing Act (MLA) and BLM appears to be following that directive.⁵⁵ To date, four lease sales have taken place in Wyoming since December 2020.

The DOI Report recommended reforms to federal oil and gas leasing and permitting practices claiming the need to “modernize the onshore and offshore oil and gas leasing programs in order to better restore balance and transparency to public land and ocean management and deliver a fair and equitable return to American taxpayers.”⁵⁶ Many of these recommendations were addressed and placed into statute through the IRA, namely, increased royalty rates, rental rates, and minimum lease bids, establishment of a nonrefundable Expression of Interest fee, and elimination of non-competitive leasing.⁵⁷ Additionally, on July 24, 2023, BLM released its proposed Onshore Oil and Gas Leasing Rule which would codify the reforms to the oil and gas leasing program through the IRA as well as recommendations contained in the DOI Report that were not included in the IRA.⁵⁸ This includes increasing bond amounts for new and existing oil and natural gas operations and limiting the areas where oil and gas development can occur. The new policies in the IRA, together with the policies in the BLM’s proposed Onshore Oil and Gas Leasing Rule, will make it more costly and difficult for natural gas development to take place on federally owned lands. This would have a significant negative impact in Wyoming, particularly given that the majority of the State’s natural gas is produced on federally owned lands.

⁵² Nathan Rott, *Biden Hits ‘Pause’ on Oil and Gas Leasing on Public Lands and Waters*, NPR (Jan. 27, 2021), <https://www.npr.org/sections/president-biden-takes-office/2021/01/27/960941799/biden-to-pause-oil-and-gas-leasing-on-public-lands-and-waters>.

⁵³ 86 Fed. Reg. 7619 (Jan. 27, 2021).

⁵⁴ U.S. DEP’T OF THE INTERIOR, REPORT ON THE FEDERAL OIL AND GAS LEASING PROGRAM (2021). (Available at <https://www.doi.gov/sites/doi.gov/files/report-on-the-federal-oil-and-gas-leasing-program-doi-eo-14008.pdf>).

⁵⁵ Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818, 2046 (2022) (to be codified at 42 U.S.C. § 18715). (Available at <https://www.congress.gov/bill/117th-congress/house-bill/5376/text?q=%7B%22search%22%3A%5B%22inflation+reduction+act%22%2C%22inflation%22%2C%22reduction%22%2C%22act%22%5D%7D&r=1&s=1>).

⁵⁶ U.S. DEP’T OF THE INTERIOR, REPORT ON THE FEDERAL OIL AND GAS LEASING PROGRAM 6 (2021).

⁵⁷ Inflation Reduction Act of 2022, Pub. L. No. 117-169, § 50261, 136 Stat. 1818, 2046 (2022) (to be codified at 42 U.S.C. § 18715).

⁵⁸ 88 Fed. Reg. 47,562 (July 24, 2023).

Environmental Controls on Methane Emissions

On December 2, 2023, EPA finalized Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review.⁵⁹

These revised regulations require additional monitoring and installation of updated equipment on new and existing natural gas facilities.

On November 22, 2022, BLM proposed the Waste Prevention Rule to reduce the waste of natural gas from venting, flaring and leaks during oil and gas production on federal lands.⁶⁰ This rule would require changes to oil and gas facilities and the payment of royalties on what is termed “avoidably lost” gas on federal lands.

All of these policies will make it more costly and more difficult for natural gas development to take place on federal lands.

Legislative Branch

Congress is focused on issues related to the environmental footprint of natural gas production and usage. On August 16, 2022, President Biden signed the IRA into law.⁶¹ The IRA appropriates \$850 million to EPA to address methane mitigation and reporting and creates a new fee on methane emissions that exceed a specified threshold. The methane fee will apply to facilities that emit more than 25,000 metric tons of methane per year and is determined by multiplying the number of metric tons of excess emissions by an initial amount of \$900 in 2024, which increases to \$1,200 per ton in 2025 and \$1,500 per ton in 2026 and beyond.⁶² On January 12, 2024, EPA released the Waste Emissions Charge for Petroleum and Natural Gas Systems, its proposed rule on the methane fee.⁶³

The IRA also created a new production tax credit (45V) for clean hydrogen with the credit value based on the lifecycle GHG intensity of the production process. For hydrogen produced from natural gas, fugitive methane emissions are taken into account.⁶⁴ On December 26, 2023, the Internal Revenue Service published its proposed Section 45V Credit for Production of Clean Hydrogen.⁶⁵

⁵⁹ 40 C.F.R. § 60 (2023). (available at https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nspc-reg-climate-review-2060-av16-final-rule-20231130.pdf).

⁶⁰ 87 Fed. Reg. 73,588 (Nov. 30, 2022).

⁶¹ Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818, 2046 (2022) (to be codified at 42 U.S.C. § 18715). (Available at <https://www.congress.gov/bills/117/congress/house/bills/5376/text?q=%7B%22search%22%3A%5B%22inflation+reduction+act%22%2C%22inflation%22%2C%22reduction%22%2C%22act%22%5D%7D&r=1&s=1>).

⁶² *Inflation Reduction Act Signed into Law, Committing \$370 Billion to Action on Climate and Energy*, BEVERAGE & DIAMOND (Aug. 17, 2022), <https://www.jdsupra.com/legalnews/inflation-reduction-act-signed-into-law-1883667/#:~:text=The%20IRA%20authorizes%20a%20fee,2025%20to%20%241%2C500%20in%202026>.

⁶³ *Waste Emissions Charge for Petroleum and Natural Gas Systems*, EPA (Jan. 12, 2024), https://www.epa.gov/system/files/documents/2024-01/wec_proposal_preamble_rule.pdf.

⁶⁴ Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818, 2046 (2022) (to be codified at 42 U.S.C. § 18715).

⁶⁵ 88 Fed. Reg. 89,220 (Dec. 26, 2023).

STATE POLICIES

With a focus on the major current export markets for Wyoming natural gas, this section discusses state policies that are expected to impact those exports going forward. With increased renewable electricity production, total natural gas consumption is expected to decline, even though dispatchable resources will become more important for grid reliability, stability and resiliency to support any significant integration of intermittent generation resources.

GHG Reduction Policies

Many western states have separately adopted a variety of GHG reduction policies which, unlike Renewable Portfolio Standards (RPS) and Clean Energy Standards (CES) that focus on the production of electricity, impose a variety of economy-wide targets or requirements related to statewide GHG emissions. In addition to CO₂, these targets and requirements assess methane, a GHG that when combusted generates CO₂.⁶⁶

The four states of primary interest in this analysis – California, Nevada, Oregon and Washington – have adopted a variety of GHG reduction policies that separately pose challenges and opportunities for exports of Wyoming natural gas into their jurisdictions. The challenge for Wyoming natural gas producers is to work with these states to recognize the lower GHG content of Wyoming natural gas.

California

For many years, California, currently the largest export market for Wyoming natural gas, has adopted a variety of goals and targets to address atmospheric emissions of GHGs. Those policies, which take many forms (e.g., some are enacted through statute while others are issued as executive orders) and impact a large number of commercial entities, generally target the production, import, and usage of fossil fuels while encouraging the use of fuels and systems that do not emit GHGs.

The foundational statute is the “California Global Warming Solutions Act of 2006” (commonly known as Assembly Bill 32, or AB 32).⁶⁷ Operating primarily through the California Air Resources Board (CARB) with the input of other state regulators, AB 32 established a statewide GHG emissions target of returning to 1990 emission levels by 2020. This represents a reduction of approximately 15% below emissions expected under a “business as usual” scenario.⁶⁸ California achieved that 2020 target in 2016, four years ahead of schedule.⁶⁹

⁶⁶ *Sources of Greenhouse Gas Emissions*, EPA, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (Nov. 16, 2023).

⁶⁷ CAL. HEALTH & SAFETY CODE §§ 38500–38599.11 (2022); (Previously, in 2005, the Governor of California by executive order established the following GHG reduction targets: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80% below 1990 levels); Cal. Exec. Order No. S-3-05 (June 1, 2005). (Available at [http://static1.squarespace.com/static/549885d4e4b0ba0bff5dc695/t/54d7f1e0e4b0f0798cee3010/1423438304744/California+Executive+Order+S-3-05+\(June+2005\).pdf](http://static1.squarespace.com/static/549885d4e4b0ba0bff5dc695/t/54d7f1e0e4b0f0798cee3010/1423438304744/California+Executive+Order+S-3-05+(June+2005).pdf)).

⁶⁸ CAL. HEALTH & SAFETY CODE § 38550; see also, *AB 32 Global Warming Solutions Act of 2006*, CALIFORNIA AIR RESOURCES BOARD (Sept. 28, 2018), <https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006>.

⁶⁹ *Climate Change*, CALIFORNIA AIR RESOURCES BOARD, <https://ww2.arb.ca.gov/our-work/topics/climate-change#:~:text=The%20state%20achieved%20its%202020,than%20mandated%20by%20AB%2032> (last visited Jan. 26, 2024).

In 2016, the statewide GHG emissions target was updated to at least 40% below 1990 levels by 2030, which the state is currently working to achieve through a variety of regulations and strategies.⁷⁰ In 2018, the Governor of California by executive order established a “new statewide goal...to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.”⁷¹

Under AB 32, every five years CARB is required to prepare and update a “Scoping Plan” that assesses policies and strategies to achieve the state’s evolving and ever-more-stringent GHG reduction targets, whether established by statute or executive order.

CARB’s draft 2022 AB 32 Scoping Plan:

- 1 Identifies policies to meet the state’s GHG reduction target of at least 40% below 1990 emissions by 2030;
- 2 Identifies a path to achieve carbon neutrality by 2045 or earlier; and
- 3 “Focuses on strategies for reducing California’s dependence on petroleum”⁷²

Referring to natural gas as “fossil gas,” one of the draft 2022 Scoping Plan’s modeled scenarios envisions that “[o]il and gas extraction and refining operations would be phased out by 2035 as demand for these fuels would also be forced to zero in 2035” [and] “all combustion-based generation resources would no longer be available.”⁷³ The draft plan would effectively ban the sale of natural gas appliances in new homes by 2026 and in new businesses by 2030.⁷⁴ The bulk of the gas in California under the draft plan would be RNG. Currently, DNG is neither recognized, nor discussed in the draft plan.

Nevada

In 2019, through passage of SB 254, Nevada requires state agencies to make policy recommendations, including proposed regulations, which would achieve a statewide reduction of net GHG emissions from a 2005 baseline of 28% by 2025 and 45% by 2030. The agencies also must qualitatively assess whether identified policies support long-term reductions of GHGs to zero or near-zero by 2050.⁷⁶

⁷⁰ S.B. 32, 2016 Leg., (Cal. 2016). (Available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32); see CAL. HEALTH & SAFETY CODE § 38566 (2017).

⁷¹ Cal. Exec. Order No. B-55-18 (Sept. 10, 2018).

⁷² CALIFORNIA AIR RESOURCES BOARD, DRAFT 2022 SCOPING PLAN UPDATE p. i (2022). (Available at <https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf>).

⁷³ *Id.*, at 44.

⁷⁴ Jacob Dick, *California Regulator Sets ‘Aggressive Pace’ for Phasing Out Natural Gas, Oil in Draft Update*, NAT. GAS INTELL. (May 12, 2022), <https://www.naturalgasintel.com/california-regulator-sets-aggressive-pace-for-phasing-out-natural-gas-oil-in-draft-update/>.

⁷⁵ Nev. Rev. Stat. § 445b.380 (2023). The Governor of Nevada subsequently signed an executive order to facilitate implementation of Nevada SB 254. *Executive Order 2019-22* (Nov. 22, 2019) (Available at https://gov.nv.gov/layouts/full_page.aspx?id=292497).

⁷⁶ NEVADA DIVISION OF ENVIRONMENTAL PROTECTION, NEVADA STATEWIDE GREENHOUSE GAS EMISSIONS INVENTORY AND PROJECTIONS, 1990-2042 p. ES-2 (2022). (Available at https://ndep.nv.gov/uploads/air-pollutants-docs/ghg_report_2022.pdf).

In 2022, the Nevada Division of Environmental Protection (NDEP) reported that the State was on track to reduce GHG emissions by 21% below 2005 levels in 2025, and 23% below 2005 levels by 2030, falling short of both SB 254 targets based on a variety of assumptions. These assumptions included the impacts

from COVID-19, increased RPS requirements, implementation of Part Two of the Safer Affordable Fuel-Efficient (SAFE) Vehicle Rule, timing of planned coal-fired and natural gas-fired electric generating unit retirements, and existing emission standards for the oil and natural gas industry.

As part of that report, NDEP listed, but did not recommend, a host of potential policies that the State could adopt to ensure compliance with the new requirements of SB 254. Among those listed policies are several that address natural gas:

- 1 For electricity generation, require that 50% of electricity sold to the State must come from renewable sources by 2030, and the adoption of a mandatory RPS of 100% by 2050;⁷⁷
- 2 For electricity generation, implement a “freeze on the approval or construction on any new fossil fuel-fired electricity generating sources” and “accelerate retirement of remaining coal-fired electric generating units (EGUs)”;⁷⁸ For electricity generation, “[m]ove towards EGUs that have lower carbon intensity as placeholders in integrated resource plan (IRP) proceedings”;⁷⁹
- 3 For oil and natural gas production, the adoption of more stringent GHG emission controls;⁸⁰
- 4 For residential and commercial, provide incentives to “increase renewable energy sourced electrification of the built environment” that would apply to new construction and existing buildings;⁸¹ and
- 5 For residential and commercial, provide incentives for the “conversion of fossil fuel dependent appliances to renewable energy sourced electric alternatives” and “[e]valuate a freeze or limitation on the installation of gas lines to newly constructed homes and businesses”.⁸²

The NDEP report separately identified terrestrial, but not geologic, sequestration policy options. Hydrogen was also not identified in the list of policy options. In furtherance of SB 254, a “2020 State Climate Strategy” was released to provide a framework and guidance for state and local policymakers on Nevada’s climate goals.⁸³

⁷⁷ *Id.*, at 48.

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*

⁸⁰ *Id.*, at 53

⁸¹ *Id.*, at 50

⁸² *Ibid.*

⁸³ *Nevada Climate Initiative Releases State Climate Strategy*, NEV. DEP’T OF CONSERVATION AND NAT. RES., (Dec. 1, 2020), <https://dcnr.nv.gov/news/nevada-climate-initiative-releases-state-climate-strategy>.

Oregon

In 2007, the Oregon Legislative Assembly established GHG reduction targets of 10% below 1990 levels by 2020 and at least 75% below 1990 levels by 2050.⁸⁴

In 2020, the Governor of Oregon issued an executive order, sometimes referred to as the “Oregon Climate Action Plan” (OCAP),⁸⁵ to take steps towards meeting the statutory 2050 goal.⁸⁶ The executive order established GHG emission reduction goals of at least 45% below 1990 levels by 2035 and at least 80% below 1990 levels by 2050.

The executive order also issued specific directives to numerous state agencies to accelerate policy actions, including proposed regulations, to work toward achieving the goals. With respect to natural gas, the executive order directed:

- 1 The Oregon Department of Environmental Quality (ODEQ) to “[c]ap and reduce GHG emissions from all other liquid and gaseous fuels, including natural gas”⁸⁷ In June 2020 ODEQ issued a final report under that mandate⁸⁸ and a public engagement process was held later that year.⁸⁹ Finally, in late 2021 ODEQ issued final regulations for a new Climate Protection Program to reduce GHG emissions associated with several types of sources and fuels, including natural gas.⁹⁰
- 2 The Public Utility Commission of Oregon (PUCO) to “[p]rioritize proceedings and activities ... that advance decarbonization in the utility sector, and exercise its broad statutory authority to reduce GHG emissions”⁹¹ Those efforts are underway.⁹² Specifically with respect to natural gas, on April 15, 2022, the PUCO issued a draft “Natural Gas Fact Finding” report which makes various policy recommendations related to reducing natural gas usage in the years ahead while taking into account costs and related burdens to end users.⁹³
- 3 The Department of Consumer and Business Services Building Codes Division to “adopt building energy efficiency goals for 2030 for new residential and commercial construction ... [t]hat ... represent at least a 60 percent reduction in new building annual site consumption of energy, excluding electricity used for transportation or applications, from the 2006 Oregon residential and commercial codes.”⁹⁴

⁸⁴ OR. REV. STAT. § 468A.205(1) (2023).

⁸⁵ *Oregon Climate Action Plan*, OR. ENV’T COUNS., <https://oeconline.org/oregon-climate-action-plan/> (last visited Jan. 25, 2024).

⁸⁶ Or. Exec. Order No. 20-04 (March 10, 2020).

⁸⁷ *Id.*, at § 4.C(3).

⁸⁸ STATE OF OR. DEP’T OF ENV’T QUALITY, PROGRAM OPTIONS TO CAP AND REDUCE GREENHOUSE GAS EMISSIONS PRELIMINARY REPORT (2020). (Available at <https://www.oregon.gov/deq/FilterDocs/CapandReducereport.pdf>).

⁸⁹ STATE OF OR. DEP’T OF ENV’T QUALITY, SCOPING PHASE PUBLIC ENGAGEMENT FINAL REPORT (2020). (Available at <https://www.oregon.gov/deq/ghgp/Documents/ghgcrScopingRep.pdf>).

⁹⁰ ODEQ Greenhouse Gas Emissions Program 2021, OR. DEP’T. OF ENV’T QUALITY, <https://www.oregon.gov/deq/rulemaking/Pages/rghgcr2021.aspx> (last visited Jan. 25, 2024).

⁹¹ Or. Exec. Order No. 20-04 (March 10, 2020).

⁹² *Utility Regulation*, OR. PUB. UTIL. COMM’N, <https://www.oregon.gov/puc/utilities/Pages/ExecutiveOrder20-04.aspx> (last visited Jan. 25, 2024).

⁹³ OR. PUB. UTIL. COMM’N, NATURAL GAS FACT FINDING DRAFT REPORT (2022). (Available at <https://edocs.puc.state.or.us/efdocs/HAH/um2178hah155046.pdf>); see also, *Natural Gas Fact Finding*, OR. PUB. UTIL. COMM’N, <https://www.oregon.gov/puc/utilities/Pages/EO-20-04-UP-FactFinding.aspx> (last visited Jan. 25, 2024).

⁹⁴ Or. Exec. Order No. 20-04 § 6.A (March 10, 2020).

In 2022, the OCAP Steering Committee published a Two-Year Progress Report providing updates on the implementation and status of addressing the issue areas for reaching the state's GHG emission reduction goals.⁹⁵

In 2021, the Oregon State Legislature passed the “Clean Energy Targets Act” (HB 2021) that requires PacifiCorp, Portland General Electric and electricity service suppliers to reduce GHG emissions associated with electricity sold in Oregon to 80% below baseline emission levels by 2030, 90% below baseline emission levels by 2035, and 100% below baseline emission levels by 2040. HB 2021 sets as policy that “retail electricity providers rely on nonemitting electricity ... and eliminate [GHG] emissions associated with service to Oregon retail electricity consumers by 2040”⁹⁷

The law defines “nonemitting electricity” as “electricity, including hydroelectricity, that is generated and may be stored in a manner that does not emit greenhouse gas into the atmosphere.”⁹⁸ Specifically with respect to natural gas, HB 2021 states that the Energy Facility Siting Council may not “[i]ssue a site certificate for a new generating facility that produces electric power from fossil fuels, including natural gas, petroleum, coal or any form of solid, liquid or gaseous fuel derived from such material, unless the council determines that a new generating facility will generate only nonemitting electricity” as so defined.⁹⁹

Both the ODEQ¹⁰⁰ and the PUCO have roles in implementing HB 2021. The PUCO has prepared a summary of the new law¹⁰¹ and an implementation strategy¹⁰². PUCO has also conducted investigations and rendered decisions related to the law’s implementation, including guidance and procedural requirements for utilities’ Clean Energy Plans and associated Integrated Resource Plans.¹⁰³

⁹⁵ Oregon Climate Action Plan, OREGON CLIMATE ACTION PLAN TWO-YEAR PROGRESS REPORT (2022). (Available at <https://oeconline.org/wp-content/uploads/2022/03/Two-Year-OCAP-Progress-Report-2022-2.pdf>).

⁹⁶ ODEQ Clean Energy Targets, OR. DEP’T. OF ENV’T QUALITY, <https://www.oregon.gov/deq/ghgp/Pages/Clean-Energy-Targets.aspx> (last visited Jan. 25, 2025); (subject to certain restrictions, “baseline emission levels” are generally the average annual emissions of GHGs for the years 2010, 2011 and 2012 associated with the electricity sold to retail electricity consumers); H.B. 2021, 81st Leg., 2021 Reg. Sess. § 1(1)(a) (Or. 2021); ODEQ published utility-specific baseline emission levels in May 2022. Memorandum from the Off. of Greenhouse Gas Program on Proposed Order to Richard Whitman (May 25, 2022). <https://www.oregon.gov/deq/ghgp/Documents/HB2021Order.pdf>.

⁹⁷ H.B. 2021, 81st Leg., 2021 Reg. Sess. § 2(1) (Or. 2021).

⁹⁸ *Id.*, at § 1(7). It is unclear if a stationary source equipped with CCUS technology qualifies as “nonemitting”; the term “sequestration” appears once in HB 2021 and in the context of responsible contractor labor standards. *Id.* at § 26(d).

⁹⁹ *Id.*, at § 28(1).

¹⁰⁰ ODEQ Clean Energy Targets, OR. DEP’T. OF ENV’T QUALITY, <https://www.oregon.gov/deq/ghgp/Pages/Clean-Energy-Targets.aspx> (last visited Jan. 25, 2024).

¹⁰¹ Oregon Public Utility Commission, *Summary of House Bill 2021*, <https://www.oregon.gov/puc/Documents/HB2021-Summary.pdf> (last visited Jan. 25, 2024).

¹⁰² Oregon Public Utility Commission, *Gantt Chart for House Bill 2021 Implementation*, <https://www.oregon.gov/puc/Documents/HB2021-Gantt.pdf> (last visited Jan. 25, 2024).

¹⁰³ HB 2021 Implementation Activities, OR. PUB. UTIL. COMM’N, <https://www.oregon.gov/puc/utilities/Pages/HB2021-Implementation-Activities.aspx> (last visited Jan. 25, 2024); See also, In the Matter of Rulemaking Regarding Direct Access Including 2021 HB 2021 Requirements, No. 23-305, 2023 WL 5424851 (2023).

Washington

In 2020, Washington updated its statutory GHG reduction targets to reduce overall emissions of GHG in the state to 1990 levels by 2020, 45% below 1990 levels by 2030, 70% below 1990 levels by 2040, and 95% below 1990 levels by 2050.¹⁰⁴

In 2021, the Washington Legislature passed the Climate Commitment Act (CCA) which establishes a comprehensive program to reduce carbon pollution and achieve specified GHG limits. The CCA requires the Washington Department of Ecology to create and implement a cap-and-invest program limiting emissions from covered entities, distributing allowances, and establishing a climate investment account for revenues. The program commenced on January 1, 2023, using total statewide anthropogenic GHG emissions from 2015–2019 as the baseline for the first compliance period of 2023–2026. The caps will be based on the State's existing statutory GHG reduction targets specified above.¹⁰⁵

Also, in 2021 the Washington Legislature directed the Washington Utilities and Transportation Commission (WUTC) to conduct a study on energy decarbonization impacts and pathways, including scenarios for reducing emissions from Washington's electricity and natural gas systems.¹⁰⁶ An engagement plan was issued on June 6, 2022, with the goal of submitting a final report to the Legislature by June 1, 2023.¹⁰⁷ The Energy Decarbonization Pathways report was released for public comment with a deadline of July 31, 2023.¹⁰⁸

Western States Renewable and Clean Energy Standards

Many western states have adopted RPS, which are policies designed to increase the production and use of renewable energy sources, such as wind and solar for electricity generation and/or CES, which generally could also apply to fossil fuels if they are decarbonized. Table 2 summarizes those standards.



¹⁰⁴ H.B. 2311, 66th Leg., 2020 Reg. Sess. (Wash. 2020).

¹⁰⁵ *Climate Commitment Act*, STATE OF WASH. DEP'T OF ECOLOGY, <https://ecology.wa.gov/Air-Climate/Climate-change/Climate-Commitment-Act> (last visited Jan. 25, 2024).

¹⁰⁶ *Natural Gas Decarbonization*, WASH. UTIL. AND TRANSP. COMM'N, <https://www.utc.wa.gov/decarbpathways> (last visited Jan. 25, 2024).

¹⁰⁷ *Ibid.*

¹⁰⁸ *Energy Decarbonization Pathways*, SUSTAINABILITY SOL. GRP., <https://cis-community.ssg.coop/washington/disclaimer> (last visited Jan. 25, 2024).

TABLE 02

State	RPS/CES	Notes
California ¹⁰⁹	44% from renewables by 2024 52% from renewables by 2027 60% from renewables by 2030 100% from renewables and zero-carbon resources by 2045	California agencies are currently defining what qualifies as a “zero-carbon resource”
Nevada ¹¹⁰	22% from renewables by 2020 24% from renewables by 2021 29% from renewables by 2022 34% from renewables by 2024 42% from renewables by 2027 50% from renewables by 2030 Non-binding 100% carbon-free by 2050	
Oregon ¹¹¹	27% from renewables by 2025 80% from renewables by 2030 90% from renewables by 2035 100% from renewables by 2040	Coal is eliminated from Oregon rates by 2030
Washington ¹¹²	15% from renewables by 2020 100% GHG-neutral by 2030 100% from renewables or non-emitting resources by 2045	Coal is eliminated from portfolios by 2025

¹⁰⁹ *State Renewable Portfolio Standards and Goals*, NAT'L CONF. OF STATE LEGISLATURES, <https://www.ncsl.org/energy/state-renewable-portfolio-standards-and-goals#:~:text=As%20part%20of%20the%20CES,any%20qualifying%20clean%20energy%20resource> (Aug. 13, 2021).

¹¹⁰ *Energy*, NAT'L CONF. OF STATE LEGISLATURES, <https://www.ncsl.org/energy/state-renewable-portfolio-standards-and-goals#:~:text=As%20part%20of%20the%20CES,any%20qualifying%20clean%20energy%20resource> (last visited Jan. 25, 2024).

¹¹¹ *State Renewable Portfolio Standards and Goals*, NAT'L CONF. OF STATE LEGISLATURES, <https://www.ncsl.org/energy/state-renewable-portfolio-standards-and-goals#:~:text=As%20part%20of%20the%20CES,any%20qualifying%20clean%20energy%20resource> (Aug. 13, 2021).

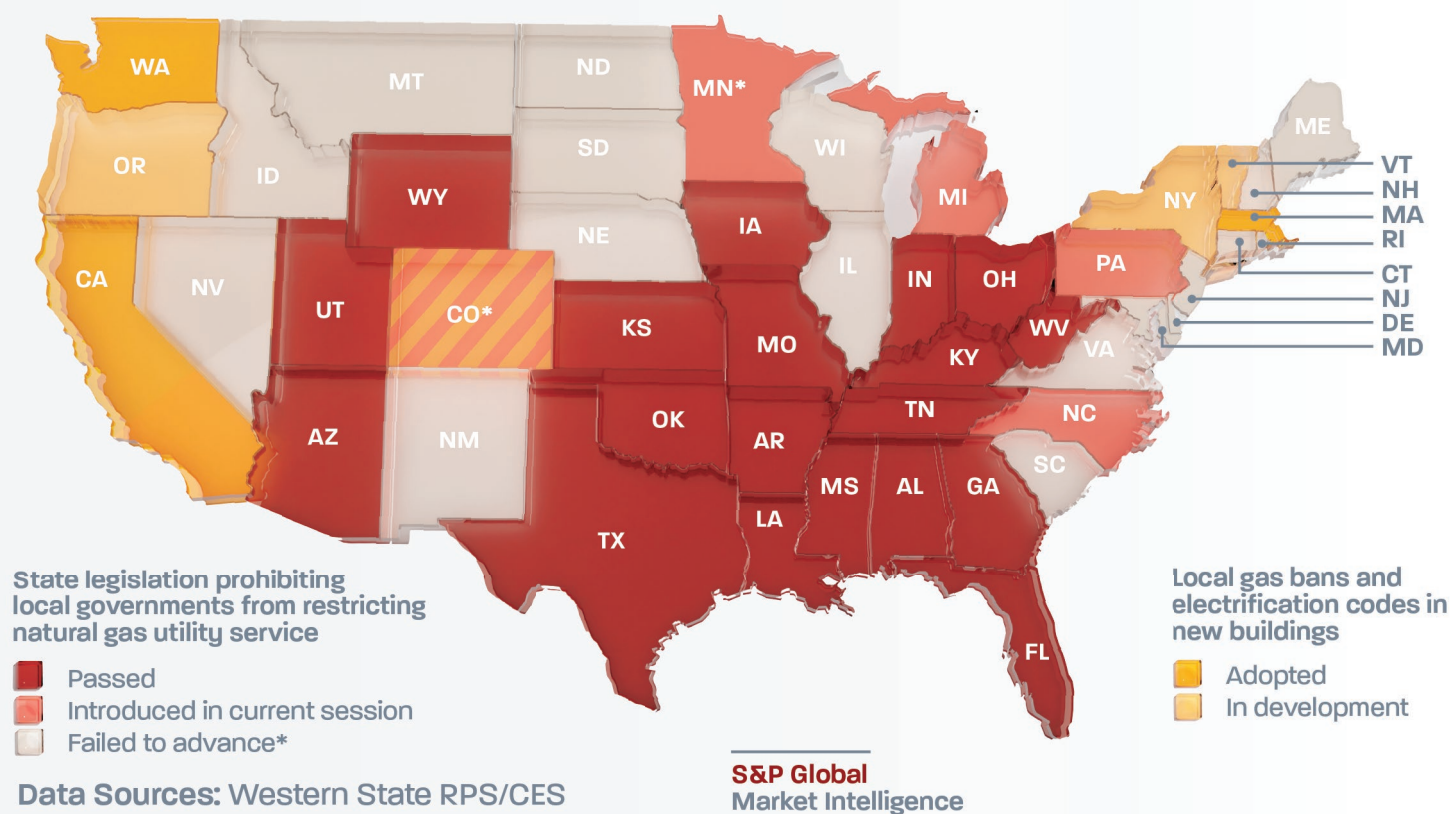
¹¹² *Id.*

State/Local Building Bans on Natural Gas

A growing number of cities in the region have either enacted or proposed measures to ban the use of natural gas in future residential and commercial buildings (Figure 11). In 2019, Berkeley, California became the first U.S. city to implement a ban on natural gas in new construction, with additional California municipalities subsequently following its lead. However, on April 17, 2023, the Ninth U.S. Circuit Court of Appeals in San Francisco overturned Berkeley's ban, ruling that the city bypassed federal energy regulations when it approved the ordinance.¹¹³ On January 2, 2024, the court declined the City of Berkeley's petition to reconsider its April 17, 2023, decision.¹¹⁴

FIGURE 11

STATES ADVANCING OR PROHIBITING BUILDING GAS BANS AND ELECTRIFICATION CODES



¹¹³ Court Throws out Berkeley, California's Ban on Natural Gas, U.S. NEWS & WORLD REP. (April 17, 2023), <https://www.usnews.com/news/us/articles/2023-04-17/court-throws-out-berkeley-californias-ban-on-natural-gas>.

¹¹⁴ Ysabelle Kempe, 9th Circuit declines to reconsider decision rejecting Berkeley, California, natural gas ban, UTIL. DIVE (Jan. 3, 2024), https://www.utilitydive.com/news/berkeley-natural-gas-ban-lawsuit-request-rehearing-en-banc-denied-federal-appeals/703514/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202024-01-03%20Utility%20Dive%20Newsletter%20%5Bissue:57802%5D&utm_term=Utility%20Dive.

¹¹⁵ Tom DiChristopher, Gas Ban Monitor: Calif. Count Reaches 50 as West Coast Movement Grows, S&P GLOB. MKT. INTEL. (Nov. 23, 2021), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-ban-monitor-calif-count-reaches-50-as-west-coast-movement-grows-67732585#:~:text=As%20part%20of%20its%202021,2030%20and%2090%25%20by%202035.>

Additional such actions include the city of San Francisco implementing a ban on natural gas connections to new buildings in November 2020.¹¹⁶ A total of fifty-four counties and/or cities in California have implemented some type of ban on natural gas or requirement for new buildings to use 100% electrical energy.¹¹⁷ Also, Seattle banned natural gas for space heating in new buildings or for replacement of heating systems in 2021.¹¹⁸

PRIVATE SECTOR DEVELOPMENTS

Investor Preferences

Investor preferences for low-carbon and/or non-GHG emitting fuels are reflected through ESG investing criteria which generally favor investments in energy sources and projects with lower carbon emissions. Consistent with these ESG developments, in early 2022 the U.S. Securities and Exchange Commission proposed detailed climate disclosure requirements for publicly traded companies.¹¹⁹

Utility Plans and Goals

The Smart Electric Power Alliance maintains a database of utility GHG commitments. Figure 12 shows “carbon-reduction targets adopted by individual electric utilities... individual electric utilities that are subject to a state-level 100% requirement,...[and] carbon-reduction targets adopted voluntarily by parent companies of utilities that provide retail electric distribution service.”¹²⁰



¹¹⁶ Kristoffer Tigue, *San Francisco Becomes the Latest City to Ban Natural Gas in New Buildings, Citing Climate Effects*, INSIDE CLIMATE NEWS (Nov. 13, 2020), <https://insideclimatenews.org/news/13112020/san-francisco-natural-gas-ban/>.

¹¹⁷ Sander Kushen, *California's Cities Lead the Way on Pollution Free Homes and Buildings*, SIERRA CLUB (Feb. 14, 2023), <https://www.sierraclub.org/articles/2021/07/californias-cities-lead-way-gas-free-future>.

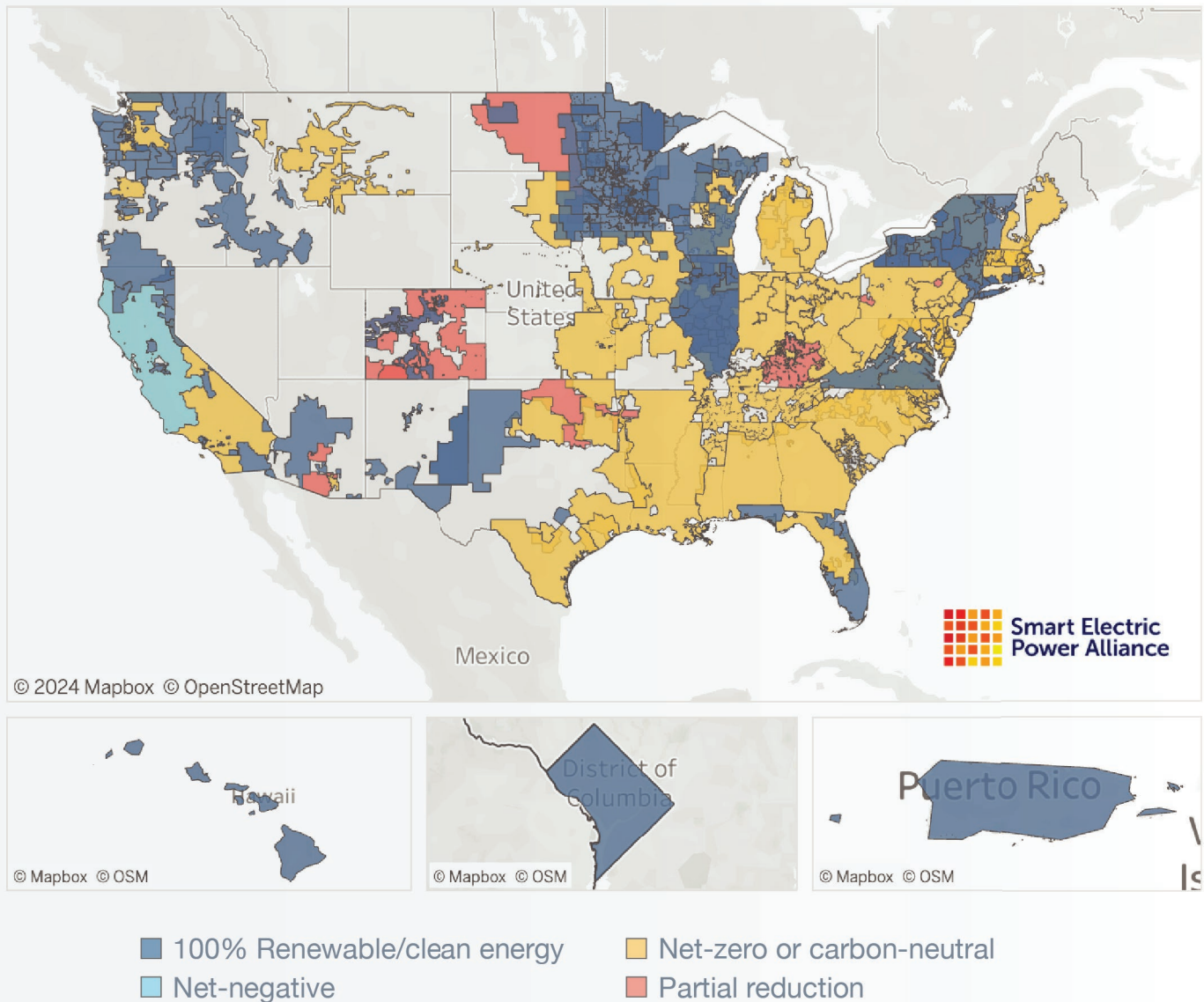
¹¹⁸ Hal Bernton and David Gutman, *Seattle City Council Passes Measure to End Most Natural Gas Use in Commercial Buildings and Some Apartments*, THE SEATTLE TIMES (Feb. 1, 2021), <https://www.seattletimes.com/seattle-news/seattle-city-council-passes-measure-to-end-most-natural-gas-use-in-commercial-buildings-and-some-apartments/>.

¹¹⁹ 87 Fed. Reg. 21,334 (April 11, 2022); see also, *Chris Flood, Energy Crisis Prompts ESG Rethink on Oil and Gas*, FIN. TIMES (July 17, 2022), <https://www.ft.com/content/c45692c7-8695-438d-9414-33137be91e79>.

¹²⁰ *Utilities' Path to a Carbon-Free Energy System*, SMART ELEC. POWER ALL., <https://sepapower.org/utility-transformation-challenge/utility-carbon-reduction-tracker/> (last visited Jan. 25, 2024).

FIGURE 12

ELECTRIC UTILITIES: CARBON-REDUCTION TARGETS (2014-2050)



Data Sources: Smart Electric Power Alliance, (sepapower.org/utility-transformation-challenge/utility-carbon-reduction-tracker)

¹²¹ *Id.* (using Electric Utilities: Carbon-Reduction Targets (2014 -2050) map).

Large investor-owned utilities have individually adopted or are considering their own corporate emission reduction goals and initiatives. For example, in March 2021, Southern California Gas Company, the nation's largest natural gas local distribution company, set a goal to achieve net-zero emissions by 2045.¹²² The company is considering different ways to source its natural gas, including increasing the amount that comes from renewable sources, such as RNG, hydrogen, and increased procurement of DNG.¹²³

Clearly, there has been significant activity related to GHG reductions in states to which Wyoming exports the majority of its natural gas, in addition to federal policy and investor/private ESG initiatives. Wyoming stakeholders can address the challenges created through these policies by increasing the recognition that the State's low-methane intensity natural gas, and DNG as a differentiated fuel, can play a role in GHG mitigation approaches, including when DNG is paired with CCUS and hydrogen production and/or consumption.

RECOMMENDATIONS

In addition to federal policy and private initiatives, there has been significant activity related to GHG reductions in the states to which Wyoming exports the majority of its natural gas. It is imperative that Wyoming policymakers employ concrete efforts to increase the recognition of DNG as a fuel that can play a role in GHG mitigation approaches, including when DNG is paired with CCUS and hydrogen production.

Energy policy related to natural gas at the Federal and State levels continue to evolve, providing ample opportunities for Wyoming policymakers to influence those endeavors. Wyoming can impact outcomes that defend its existing market share and potentially create new markets for fuels such as natural gas and DNG while leveraging the State's leadership in CCUS and hydrogen technologies, infrastructure, and policies. The following are recommendations for Wyoming policymakers to consider.

- 1 Designate specific legislators to serve as liaisons to engage directly with colleagues in California, Oregon, Washington, and Nevada regarding their ongoing statutory efforts to implement decarbonization goals. These liaisons can educate their colleagues about the low-carbon nature of Wyoming natural gas and urge them to amend current decarbonization statutes to recognize the inherent benefits of using Wyoming natural gas to meet their clean energy goals. This engagement will increase awareness of Wyoming's low-methane intensity natural gas, highlighting its inherent climate benefits, energy security, and reliability attributes.

¹²² SOCALGAS, ASPIRE 2045 SUSTAINABILITY AND CLIMATE COMMITMENT TO NET ZERO (2021). [SoCalGas_Climate_Commitment.pdf](#)

¹²³ *Ibid.*

- 2 WEA, in pursuit of its mission to encourage and promote Wyoming energy, should be given the resources to adequately undertake direct engagement with the following entities/state agencies to advocate for Wyoming's natural gas producers:

WYOMING'S NATURAL GAS CONSUMERS

Regional Entities	Western Interstate Energy Board
California	California Energy Commission, California Air Resources Board, California Public Utilities Commission
Oregon	Oregon Department of Energy, Oregon Department of Environmental Quality, Public Utilities Commission of Oregon
Washington	Washington State Energy Office, Washington State Department of Ecology, Washington Utilities and Transportation Commission
Nevada	Nevada Governor's Office of Energy, Nevada Division of Environmental Protection, Nevada Public Utilities Commission

Engagement by WEA could focus on increasing awareness of the low-methane intensity attributes of Wyoming's natural gas, and highlight the inherent climate benefits, energy security, and reliability it provides. WEA, through development of strategic relationships, could advocate for Wyoming's natural gas producers in other states specifically by demonstrating the importance of quantifying emissions on a basin or state basis, rather than on calculation methods that use a nationwide emission factor.

- 3 The School of Energy Resources should undertake research to analyze the components of natural gas certification programs by:

- Describing the purposes;
 - Explaining different models;
 - Providing information on the process for receiving certification;
 - Assessing measurement technologies; and
 - Identifying potential unintended consequences.
- The research should focus on whether differentiated natural gas certification programs are a viable option for Wyoming natural gas producers to assure potential purchasers that the attribute profile required to meet clean energy goals and statutory mandates has been attained.

- 4 The Wyoming Integrated Test Center (ITC) is a post-combustion, flue gas research facility located at Basin Electric's Dry Fork Power Station near Gillette, Wyoming. With equipment upgrades the ITC could be used to simulate additional emission sources, including natural gas. Subject to funding, the ITC should design and construct a flue gas dilution system for the ITC that would dilute flue gas to simulate natural gas. The system will allow for advanced carbon capture research specifically tailored to natural gas power generation.

CONCLUSION

Wyoming is uniquely positioned to thrive in the face of state and federal carbon management policies aimed at significantly reducing or eliminating the development and use of natural gas as a fuel source. Even though the State exports most of its natural gas to states to the west that have adopted energy and environmental policies that disfavor natural gas, Wyoming holds significant advantages to defend the State's existing market share and create new markets through its low-methane intensity natural gas, DNG, CCUS, and emerging technologies such as hydrogen production.

Wyoming policymakers should continue to support research and proactively engage in policy actions to promote these advantages at both the federal and state levels, to ensure a bright future for the development, production, and consumption of the State's natural gas.





