**November 5, 2020**

California Air Resources Board

1001 I Street

P.O. Box 2815

Sacramento

California 95812

Re: Low Carbon Fuel Standard Public Workshop to Discuss Potential Regulation Revisions

Dear California Air Resources Board:

The Wyoming Energy Authority (WEA) is pleased to submit these comments on the referenced matter. On July 1, 2020, the Wyoming Infrastructure Authority merged with the Wyoming Pipeline Authority to create WEA. WEA serves as a unifying organization for Wyoming’s energy industries and is also the new home of State Energy Office. WEA’s mission is to advance Wyoming’s energy strategy by driving data, technology, and infrastructure investments. WEA’s vision is to support and promote Wyoming’s energy sector by implementing the state’s energy strategy; delivering positive economic impact and jobs for Wyoming; fostering an environment for the sustainability and growth of Wyoming’s economy; and ensuring Wyoming continues to power the nation.

These comments are focused on “[a]reas for additional clarity or potential changes to the [CCS] protocol” (<https://ww2.arb.ca.gov/sites/default/files/2020-10/101420presentation_carb.pdf>, slide 43).

**Comments**

The State of Wyoming is vitally interested in the California Air Resources Board’s (CARB) implementation of the Low Carbon Fuel Standard (LCFS). Wyoming produces prodigious amounts of both fossil and renewable energy. Wyoming produces fifteen times more energy than it consumes, which means it is the largest net energy supplier among the states.[[1]](#footnote-1) Wyoming sends almost three-fifths of the electricity – a transportation fuel -- it generates out of state, including California.

Wyoming exports the bulk of the crude oil and natural gas its produces, and is working diligently to decarbonize those fossil resources. The State of Wyoming is a leader in low-carbon energy technologies. Wyoming Governor Gordon has emphasized that the end goal should be reducing atmospheric concentrations of carbon dioxide (CO2) as opposed to penalizing the use of any

specific fuel without considering the climate impacts of that policy decision.[[2]](#footnote-2) Wyoming’s leadership on CCS/CCUS is notable on several fronts. Wyoming is:

* One of the only states that has enacted a suite of CCS/CCUS laws, which individually and collectively reduce risks for project investors. Wyoming law:
* Specifies who owns the pore space (Wyo. Stat. § 34-1-152 (2019));
* Establishes permitting procedures and requirements for CCS sites, including permits for time-limited research (id. § 35-11-313);
* Provides a mechanism for post-closure MRV via a trust fund approach (id. § 35-11-318);
* Provides a mechanism for unitization of storage interests (id. § 35-11-315);
* Specifies that the injector, not the owner of pore space, is generally liable (id. § 34-1-513);
* Clarifies that vis-à-vis storage rights, production rights are dominant but cannot interfere with storage (id. § 30-5-501); and
* Provides a certification procedure for CO2 incidentally stored during EOR (id. § 30-5-502.
* The only state to enact a low-carbon/CCUS-based standard (H.B. 200) for coal-fired power plants that are regulated as public utilities. And again, electricity is a transportation fuel.
* Now only the second state to be granted primacy from the U.S. Environmental Protection Agency (EPA) for implementation of the CO2 injection regulations under the Class VI of the Safe Drinking Water Act’s Underground Injection Control program ((85 Fed. Reg. 64053 (2020)).
* An international leader in many aspects of CCUS technology. Researchers at UW, for example, are currently funded by the U.S. Department of Energy (DOE) to advance a potential large-scale integrated CO2 storage project in Gillette, Wyoming.[[3]](#footnote-3) Several years ago, comparable geologic assessments were conducted at another site in the state.[[4]](#footnote-4) UW is part of the Montana State University-led WAFERx project, which is funded by the National Science Foundation to evaluate the feasibility of the widespread adoption of BECCS in the Upper Missouri River Basin.[[5]](#footnote-5)
* Home to the Wyoming Integrated Test Center, where researchers test the utilization and management of CO2 that is sourced from a coal-fired power plant.[[6]](#footnote-6)

California almost certainly will continue to rely upon fossil fuels which, going forward, will have to be decarbonized in compliance with California’s stringent GHG reduction goals and requirements that span the production and/or usage of all manner of fuels, from transportation to home heating to electricity. California additionally is likely to continue to rely upon out-of-state energy sources.

For example, according to the U.S. Energy Information Administration (EIA), California imports the most electricity from other states (see Fig. 1[[7]](#footnote-7)).



California similarly imports non-trivial volumes of natural gas from neighboring states. Again according to EIA[[8]](#footnote-8):

California's natural gas output equals about one-tenth of state demand. Almost two-thirds of California households use natural gas for home heating, and almost half of the state's utility-scale electricity generation is fueled by natural gas. Several interstate natural gas pipelines enter the state from Arizona, Nevada, and Oregon and bring natural gas into California from the Southwest, and from the Rocky Mountain region, as well as from western Canada. Almost all the natural gas delivered to California is used in the state or is placed in storage. Some natural gas is exported to Mexico, and a much smaller amount is liquefied and shipped by cryogenic container to Hawaii.

Wyoming is a prodigious exporter of energy generally – both fossil and renewable – and is a leading state for decarbonization technologies such as CCS and CCUS, as highlighted above. A recent study by Stanford University and the Energy Futures Initiative (Stanford/EFI Study) discussed the critical role that these technologies could play in rapidly decarbonizing California’s economy, concluding[[9]](#footnote-9):

CCS, like all other emission reduction technologies, is not a “silver bullet” technology for decarbonization. Carbon capture paired with permanent geologic storage (e.g. deep saline reservoir) offers a viable and important option for reducing emissions from the industrial and electricity sectors that are key contributors to California’s economy and the reliability of its grid. Several industries—chemicals, transportation fuels, cement, plastics, and rubber products—rely on facilities that are large sources of emissions. With CCS, these facilities and sectors could be rapidly decarbonized and continue to make major contributions to the state’s economy while helping it meet its near-term and midcentury climate targets.

Forty-three percent of California’s in-state electricity generation in 2019 was natural gas-fired. In addition to being the largest fuel source for in-state power generation, natural gas remains a prominent source of firm generation for California. In the power sector, CCS can be paired with natural gas combined cycle (NGCC) power plants to create a “clean firm” resource, which multiple studies identify as critical for maintaining grid reliability and managing energy system costs as California continues to build out its renewable resources. An analysis of California’s pathways for achieving its Senate Bill (SB) 100 goals indicated that California will need approximately 30 gigawatts (GW) of clean firm generation resources to cost-effectively decarbonize its grid. The value of clean firm generation should not be underestimated through the clean energy transition.

Technoeconomic analysis done for this study identified 76 existing electricity generation and industrial facilities in California as candidates for CCS, representing close to 15 percent of the state’s current GHG emissions. To put this in perspective, in 2017, California’s buildings sector was responsible for 10 percent of its emissions and its power sector emitted 15 percent of the total. CCS is a strong complement to other decarbonization strategies.

For California’s cement industry, CCS is considered one of the most cost-effective carbon reduction options and supports other strategies like increased energy efficiency, clinker substitution, and fuel switching.

CO2 storage is a critical enabler of prominent carbon dioxide removal (CDR) pathways, including: direct air capture (DAC) and conversion of waste biomass to zero- or negative-carbon transportation fuels and electricity …

Today, California is at a crossroads in CCS development. Despite a strong foundation of climate policy support, sizeable technical potential to rapidly decarbonize, and natural resources that could enable the state to become a leader in CCS, it has no CCS projects that are operational. If CCS is to play a meaningful role in meeting the state’s 2030 emission reduction targets and 2045 carbon neutrality ambitions, California policymakers should consider additional and immediate actions to promote targeted deployment of CCS today.

We believe that it is important that CARB’s CCS protocol be aligned with the federal Class VI regulatory program to the extent possible to enable projects in Wyoming, which recently was granted Class VI primacy, to qualify for the California program. The following table (Table 1) outlines some, but not all[[10]](#footnote-10), of the differences between the federal program and CARB’s CCS protocol.

**Table 1**

| **Element** | **Federal Class VI Program** | **California CCS Protocol** |
| --- | --- | --- |
| Minimum injection depth | None | 2,800 feet |
| Maximum injection pressure | 90% of fracture gradient | 80% of fracture gradient |
| Lateral extent of area to be protected | CO2 plume and pressure front | CO2 plume |
| Post injection site care period | 50 years (default) | 100 years following cessation of injection |
| Financial assurance | Amount generally determined by EPA | Permittee prepares cost estimates |
| Third-party certification | Not required | Required |
| Well-plugging | No minimum plugging timeline | Specified and additionally regulated |

The Stanford/EFI Study referenced above reached a similar conclusion, noting: “While the adoption of the CCS Protocol under California’s Low Carbon Fuel Standard (LCFS) was a clear step forward for the advancement of CCS deployment in California, a number of policy, legal, and financial challenges have limited its utilization. To date, no CCS projects have successfully applied for and received credits under the LCFS … [and] California’s current policy and regulatory environment makes it difficult for CCS to achieve its emission reduction potential in California.”[[11]](#footnote-11)

The Stanford/EFI Study included a “Policy Action Plan” with numerous recommended steps that California could implement to advance CCS/CCUS, including improving and coordinating permitting for such projects. We broadly endorse those and related recommendations set forth in the study.

We also believe it important that the LCFS regulations, in conjunction with CARB’s CCS protocol, be interpreted in a manner to ensure the eligibility of CCS/CCUS-based decarbonized fossil energy projects provided all other federal regulatory standards are met (e.g., the Class VI program).

WEA would welcome the opportunity to meet with CARB to discuss these issues in greater detail.

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We appreciate the opportunity to submit these comments.

/s

Dr. Glen Murrell

Executive Director

1. Wyoming State Energy Profile (U.S. Energy Information Administration, Feb. 20, 2020) (available at <https://www.eia.gov/state/analysis.php?sid=WY>). [↑](#footnote-ref-1)
2. *See* <https://www.wyofile.com/can-mark-gordon-save-coal-and-stop-climate-change/>. [↑](#footnote-ref-2)
3. *See* <https://www.uwyo.edu/cegr/research-projects/carbonsafe-p2-dryfork.html>. [↑](#footnote-ref-3)
4. *See* <https://www.uwyo.edu/cegr/research-projects/project-wy-cusp.html>. [↑](#footnote-ref-4)
5. *See* <https://waferx.montana.edu/the_project.html>. [↑](#footnote-ref-5)
6. *See* <https://www.wyomingitc.org/about/>. [↑](#footnote-ref-6)
7. *See* <https://www.eia.gov/todayinenergy/detail.php?id=38912>. [↑](#footnote-ref-7)
8. *See* <https://www.eia.gov/state/analysis.php?sid=CA>. [↑](#footnote-ref-8)
9. *See* <https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5f96e219d9d9d55660fbdc43/1603723821961/EFI-Stanford-CA-CCS-FULL-rev1.vF-10.25.20.pdf> at pp. S-1, S-2 (footnotes and internal references omitted). [↑](#footnote-ref-9)
10. For a recent summary of many key differences between the two regulatory programs, see <http://www.kgs.ku.edu/PRS/IMSCSH/pdfs/ccus_conference_3/Tiraz_Birdie.pdf>. [↑](#footnote-ref-10)
11. <https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5f96e219d9d9d55660fbdc43/1603723821961/EFI-Stanford-CA-CCS-FULL-rev1.vF-10.25.20.pdf> at p. 28. [↑](#footnote-ref-11)