AB 32 Climate Change Scoping Plan First Update: Comments and Recommendations

Comments Submitted to the California Environmental Protection Agency
Air and Resources Board (CARB)

by

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on behalf of

Physicians, Scientists & Engineers for Healthy Energy, Inc.
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Dear Members of the California Air Resources Board,

Physicians Scientists & Engineers for Healthy Energy (PSE) is a United States-based, multidisciplinary scientific non-profit that provides evidence-based information on novel energy production methods, such as shale gas, shale (tight) oil, and renewable energy technologies. PSE has offices in Oakland, CA, Ithaca, NY, and New York, NY, and maintains formal associations with faculty members at University of California at Berkeley, Stanford University, Cornell University, Weill Cornell Medical College, University of Pennsylvania, and George Washington University, among other institutions and organizations. The aim of PSE is to bring scientific transparency to important policy issues surrounding energy policy issues.

The Global Warming Solutions Act (AB 32) has helped California develop a balanced approach to addressing climate change through its development of regulations and market mechanisms. It has been largely successful and has fostered a clean-energy economy through new technologies, venture capital investment, and job creation. Meanwhile, greenhouse gas emissions have dropped sharply since 2008 towards the 2020 target (427 MMT). The success of AB 32 has been due to a number of diverse measures outlined in the 2008 scoping plan, such as the a low carbon fuel standard, advanced clean cars, cap-and-trade regulation, sustainable community strategies, water efficiency, building efficiency standards, and a movement toward a 33% renewable energy portfolio standard. All of these measures are correctly focused on the reduction of greenhouse gas emissions and the transition to cleaner, sustainable forms of energy.

For this reason, we are concerned that the new scoping plan does not include a measure and evaluation of carbon and carbon equivalents stemming from oil and gas production. If California is serious about managing climate change and reaching its 2020 and 2050 greenhouse gas emissions goals, it must include fossil fuel *production*, and not only fossil fuel refining and consumption under the cap. Indeed, California is the fourth largest oil producer in the lower-48 United States and data suggests that it contributes a potentially significant amount of greenhouse gas emissions to the atmosphere.

The production of fossil fuel resources such as oil and gas development is a potentially significant part of the overall lifecycle emissions (Brandt 2011; Karion, Sweeney et al. 2013; Peischl 2013) of fossil fuels. Much of the oil currently developed in California is very carbon intensive to produce and process (Brandt 2011; CARB 2012). The California Air Resources Board (CARB) reported in 2012 that more than 30% of the oil developed in California is as carbon intensive to develop and refine as the Alberta tar sands in Canada (CARB 2012), one of the most climate-disrupting fuels on earth. CARB's reporting did not include the development of the Monterey Shale, which may be even more carbon intensive to develop than conventionally developed oil. Although steam injection and other types of thermal well stimulation techniques are likely to be the most greenhouse gas intensive (Brandt 2011), factors such as the production rate, well depth, and length of the lateral well may hold implications for the carbon intensity of shale tight oil and gas development, including high volume hydraulic fracturing and acidization.

Evidence suggests the process of fossil fuel development including shale tight oil and gas development using hydraulic fracturing, acidization, and other forms of well stimulation will exacerbate many environmental issues, particularly climate disruption due to fugitive methane leakage throughout the lifecycle. AB 32 appropriately considers both carbon dioxide (CO_2) and CO_2 equivalent emissions (CO_2-eq), including methane, NO_x, sulfur hexafluoride, hydroflourocarbons, and perflourocarbons. Methane is a potent greenhouse gas with a global warming potential that is 86 times that of CO_2 on the 20 year time horizon (IPCC 2013), a time frame that is particularly relevant given AB 32's greenhouse gas emission goals for 2020 and 2050. Methane is vented and leaked into the atmosphere during shale gas and tight oil development production and recent field measurements in the Los Angeles Basin of California indicate that 17% of gross natural gas production is leaked to the atmosphere (Peischl 2013), a very high number from a climate and air quality perspective. According to the US EPA, oil and gas development emits more methane to the atmosphere in the United States than any other industrial process.

In addition to greenhouse gas emissions, CARB has enumerated goals of reducing co-pollutant emissions that may be health damaging such as volatile organic compound (VOC), nitrogen oxides (NO_x), and 8-hr ozone attainment. While VOCs and NO_x are health damaging in their own right, these compounds are the primary anthropogenic driver of atmospheric production of tropospheric (ground-level) ozone a key risk factor for asthma, other respiratory and cardiovascular illnesses (EPA 2013). Moreover, tropospheric ozone is also a shorter-lived greenhouse pollutant and contributes to climate warming (IPCC 2013). Studies suggest that oil and gas development increase atmospheric concentrations of ground-level (tropospheric) ozone due to emissions of ozone precursor emissions such VOCs and NO_x (Kemball-Cook, Bar-Ilan et al. 2010; Pétron, Frost et al. 2012; Roy, Adams et al. 2013).

Other air pollution emissions from oil and gas development, and especially high volume hydraulic fracturing (HVHF), include diesel particulate matter, benzene, and aliphatic hydrocarbons may contribute to health problems among populations living near oil and gas development sites (McKenzie, Witter et al. 2012). Failing to put oil and gas development under the AB 32 cap could thus potentially place an unequal environmental burden on low-income people of color who disproportionately live in close proximity to oil and gas development. Much of the air pollution emissions from oil and gas development come from the production phase and thus it would be detrimental to exclude this stage of the overall development from the scope of AB 32 given its stated goals.

AB 32 is correct to focus on energy alongside transportation, agriculture, building infrastructure, water, waste, and land use as useful measures for lowering emissions and combating climate change. However, if it is serious about reaching its goal it must include more focus on oil and gas production. The comments that follow will be directed towards climate change mitigation efforts and progress toward the 2020 goal, focusing in particular on the energy sector, GHG emissions, and the latest understanding of climate science.

1. **Change the Global Warming Potential (GWP) of Methane (CH_4) to Reflect Latest Measures from IPCC's Fifth Assessment Report (2013)**

   As noted in section III(C)(b) *Emission Reductions to Meet the 2020 Target* of the scoping plan, most national and international climate change organizations have move to the International Panel on Climate Change's (IPCC) Fourth Assessment Report (AR4) (2007) when considering the potency (GWP) of high global warming potential gases such as methane. Previously, the board approved a total statewide GHG 1990 emissions level and 2020 emissions limit based on the IPCC's second report published in 1996. Presumably, the decision to update the 2020 goal, weighting the 1990 emissions with GWPs from the Fourth Assessment Report, was to incorporate the most accurate and current scientific information on GWPs.

   Given the recent publication of IPCC's Fifth Assessment Report (AR5) on September 26, 2013, CARB likely did not have the ability to account for recent assessments in its scoping plan. However, the report is available with new numbers for the GWP of methane and other high potency greenhouse gases. CARB should incorporate these more up-to-date numbers into its weighting scheme.

   The new IPCC *Climate Change 2013* report assigns higher measures to the global warming potential of methane of 86 over a 20-year time frame and 34 over a 100-year time frame. This is up from 72 and 25, respectively in AR4, meaning the GWP increased 19.4% for the 20-year time frame and 36% for the 100-year time frame. These changes are not insignificant, however, the decision to adhere to up-to-date consensus climate science will determine the meaning and accuracy of CARB's statewide GHG emission inventory, forecasts, and targets.

2. **Include More Discussion of Methane Emissions from Oil and Gas Industry Under the Cap**

   The scoping plan draft acknowledges that methane is emitted from the oil and gas industry during transmission when it is vented and leaked from processing equipment and pipelines (p. 16). Then, in the impact section concerning high global warming potential gases, it is recommended that releases of high-GWP gases (e.g., methane) should be avoided using gas recovery options, "such as…leak tightness specifications" (p. 44). The Scoping Plan acknowledges a proposal to develop a measure to reduce venting and fugitive emissions associated with oil and gas production. The proposal will be based upon a "survey of the industry to improve the emissions inventory for this sector" (p. 36).

3. **Include All Upstream (Oil and Gas Production) And Midstream (Oil and Gas Transmission) Emission Sources Of Oil And Gas Development Under The Cap**

   There are multiple greenhouse pollutant emission sources in both the upstream (oil and gas production) and midstream (oil and gas transmission) that should be included under the AB 32 cap. Vented and fugitive emissions of CH_4, NO_x, VOCs, and other greenhouse pollutants and greenhouse pollutant precursors are known to be emitted from multiple sources including, but not limited to: wellhead compressors, pneumatic devices, heaters, flares, drill rigs, natural gas dehydrators, completion venting, blowdowns, wastewater storage tanks and sumps, and glycol dehydrators (Kemball-Cook, Bar-Ilan et al. 2010; US EPA 2012).

Sources Cited

Brandt, A. (2011). "Oil Depletion and the Energy Efficiency of Oil Production: The Case of California." Sustainability **3**: 1833-1854.

CARB (2012). Detailed California-Modified GREET Pathway for California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB) from Average Crude Refined in California. Sacramento, CA, California Air Resources Board.

EPA, U. (2013). Integrated Science Assessment for Ozone and Related Photochemical Oxidants. Washington, DC, United States Environmental Protection Agency.

IPCC (2013). Working Group I Contribution To The IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis, Intergovernmental Panel on Climate Change.

Karion, A., C. Sweeney, et al. (2013). "Methane emissions estimate from airborne measurements over a western United States natural gas field." Geophysical Research Letters: n/a-n/a.

Kemball-Cook, S., A. Bar-Ilan, et al. (2010). "Ozone impacts of natural gas development in the Haynesville Shale." Environ Sci Technol **44**(24): 9357-9363.

McKenzie, L. M., R. Z. Witter, et al. (2012). "Human health risk assessment of air emissions from development of unconventional natural gas resources." Sci Total Environ **424**: 79-87.

Peischl, J., et al. (2013). "Quantifying sources of methane using light alkanes in the Los Angeles basin, California." Journal of Geophysical Research: Atmospheres **118**: 1-17.

Pétron, G., G. Frost, et al. (2012). "Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study." Journal of Geophysical Research-Atmospheres **117**(D04304): 1-19.

Roy, A., P. Adams, et al. (2013). "Air pollutant emissions from the development, production and processing of Marcellus Shale natural gas." Journal of the Air & Waste Management Association.

US EPA (2012). Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews: 40 CFR Parts 60 and 63. Washington, DC, United States Environmental Protection Agency.