Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Catherine Reheis-Boyd
President

June 16, 2016

Ms. Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: WSPA comments on AB 32 Cap & Trade Regulation Emissions Leakage Potential Studies

Dear Ms. Sahota:

The Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states. WSPA appreciates this opportunity to provide comments on the rulemaking process and concepts identified by the Air Resources Board (ARB) during its public workshop on May 18, 2016 on the Cap & Trade program emissions leakage potential studies. WSPA appreciates the information provided during the presentations at the workshop by ARB staff and the authors of the studies. Pursuant to those presentations, WSPA has additional general and specific comments and questions that deserve attention by ARB and program stakeholders before study results are used to inform changes to the Cap & Trade regulation.

General Comments

As noted in WSPA's May 16, 2016 comment letter on Cost Containment, Post-2020 Cap Setting, and Emissions Allocation, WSPA remains concerned with the manner in which ARB is conducting this rulemaking process. In particular, WSPA objects to ARB's proposal to bring a "framework" set of Cap & Trade amendments to the Board for adoption in July, 2016, and relegate critical program design and implementation issues, such as industrial assistance, to a series of 15-day packages in the fall 2016 through winter 2016-2017 timeframe. There is no compelling reason for this approach. It needlessly constrains stakeholder input and limits the scope of changes ARB can consider to those that fit within the framework document. The 15-day process should be used to respond to comments made during the public hearing and in writing, not to define major elements of the regulation. WSPA maintains that ARB should issue a complete discussion draft proposal for stakeholder review and comment in advance of the 45-day notice of proposed rulemaking.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

With regard to the leakage studies themselves, the limited time frame between the release of the studies and ARB's informal comment deadline is wholly inadequate to evaluate these critical and highly technical documents. ARB has indicated that initial comments (such as provided here) will serve to inform staff and the ARB Board on final leakage study outcomes which in turn would inform policy decisions concerning leakage risk assessment and industry assistance factors for future compliance periods. Taking more time on the front end of the review process will result in more substantive input to ARB and greater certainty for stakeholders. By providing only 2-3 weeks to review studies that have taken more than a year to develop, ARB is clearly limiting stakeholders' ability to fairly and comprehensively review these documents.

WSPA is also concerned about how these studies may be interpreted by ARB to modify critical elements of the Cap & Trade program such as industry assistance requirements. These decisions are tied to ARB's conceptual proposal for new metrics that would measure leakage potential in terms of international market transfer and domestic value-added loss.[1] We are not confident that this approach is valid for purposes of evaluating leakage potential in emissions intensive industries. Without further information on ARB's conceptual proposal, some understanding of how the leakage studies will be used in that context and how ARB's overall analysis will inform decisions on leakage and trade exposure policy, our ability to draw conclusions and make recommendations is significantly diminished. We would appreciate the opportunity for additional discussion with ARB on these issues before it notices proposed changes to the Cap and Trade regulation.

Specific Comments on ARB Contractor Reports

It is clear that important information was omitted from the data base used in the leakage studies that render the results unfit for purposes of evaluating prospective leakage risk and assigning industrial assistance allocations. Among other issues, we are concerned about the following omissions: (1) onsite-generated electricity and gas, (2) failure to account (and adjust) for low natural gas usage during the study time periods, and (3) regulatory policies that are likely to alter future fuel demand, making prior year conclusions unrepresentative of future years. The following comments address some of these issues in greater detail.

With regard to natural gas usage we note that natural gas prices were volatile during the study periods and therefore the authors' heavy reliance on natural gas impacts makes the study findings inherently unreliable. In fact, the amount of petroleum product that enters and exits the state is not directly correlated to the price of natural gas.[2] The majority of refineries in California use a relatively small amount of purchased natural gas and less than 2% of refinery electricity is purchased from the grid due to heavy reliance on cogeneration.[3] With regard to the effect of

[1] ARB "Staff Presentation on a Methodological Framework for Emissions Leakage Designation for 2018 and Beyond", slides 20-23.
[2] See also NERA Economic Consulting report, *Comments on Cap-and-Trade Program Public Workshop on Emissions Leakage Studies* ("NERA report"), prepared for the California Manufacturers and Technology Association, June 9, 2016, page 20, footnote 13.
[3] NERA report, page 19, footnote 11.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

regulations on future fuel demand, we note that the studies offer unrealistically low long term estimates of carbon prices (especially in light of the 2030 emission reduction target in EO B-30-15), and fail to consider the likelihood that declining in-state demand will lead to an increase in fuel exports.

1. Energy Intensity for Refining

   Studies that look at purchased natural gas and electricity only do not correctly estimate refinery energy intensity. Generally a hypothetical refinery may purchase only 25-40% of the total energy consumed at the facility and self-generate the rest in the form of process gas, FCC Coke, and Recovered Process Heat (Steam).

   Energy intensity is calculated using the following equation: Energy Intensity = Energy Used / Product Produced. Refineries are likely 3-4 times more sensitive than calculated in the UC Berkeley and RFF papers because the authors undervalued the numerator (energy used). Virtually all of refinery "energy used" (except maybe recovered process heat) is used to create product and will have associated GHG emissions. In addition, fuel gas should be valued at the same level as natural gas because both gasses can be used interchangeably in many processes and thus are generally treated by refineries on the same basis.

   The proposed methodology is flawed because it does not account for fuel generated at the refinery. While the lack of transparent or reported data in the third-party domain for fuel generated and used on site has been a challenge in other jurisdictions such as the EU, ARB already collects fuel use data under MRR and for the AB 32 Cost of Implementation regulation. Thus ARB could include fuel gas data in evaluating energy intensity for refining.

2. Validity of the data set used for the UC Berkeley study

   Our read of the report suggests that no information on refineries was included among the 50,000 sources that submit data to the Annual Survey of Manufacturers (ASM) or Census of Manufacturers (CMF) (see: http://www.census.gov/programs-surveys/asm.html). Yet such data is readily available from the U.S. Energy Information Administration (EIA). Refineries are required to submit EIA810 and EIA820 reports to EIA on a monthly and annual basis (see: https://www.eia.gov/petroleum/). Moreover, because EIA's core function is to compile and analyze energy industry data, it is a more reputable source for such data.

   We understand the author's need to generalize to allow for analysis of all 95+ industries at once and on the same basis. Unfortunately, using such broad data sets masks important distinctions among industries and diminishes the accuracy and utility of the results.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

3. Study time frames underestimate refinery energy use

   The refining industry self-generated the vast majority of its electricity in the 1998-2008 timeframe, which covers the bulk of the leakage study period. Most refineries also used far more process gas than natural gas in their fuel gas systems. [4]

   The change in relative energy prices used as a basis for UC Berkeley's regression analysis is driven by changes in U.S. natural gas prices from 1993 to 2012. Prices were highly volatile during this entire period (see: https://www.eia.gov/dnav/ng/hist/n9190us3a.htm). As a general rule, most refineries do have some flexibility to substitute process gas for purchased natural gas during periods of high natural gas prices. However, under this scenario high value product yield would be reduced, in which case the study would underestimate the impacts of natural gas price fluctuations in the refining sector.

4. Study data base may have conflated onsite hydrogen plants with refinery operations

   Hydrogen manufacturing should be included in Industrial Gas Manufacturing (NAICS6 325120). In the current Cap & Trade regulation, refinery allowances are allocated separately based on CWB (Petroleum Refineries) and H2 produced (Industrial Gas Manufacturing) and each has its own industry assistance factor based on trade exposure. It is unclear from the reports whether "Petroleum Refineries" includes on-site H2 plants. We are concerned that the data sets may not consistently separate H2 plants owned and operated by refineries from the refineries themselves.

   If refinery hydrogen was not separated out, then the large amount of process emissions from hydrogen would be a significant source of bias that would underestimate refinery energy intensity. Both reports are clear that process emissions were not included. Hydrogen plant process emissions can range from 20% to 30% of total refinery emissions. Given that hydrogen plants are integral to production of product, their emissions must be included in any evaluation of refinery energy intensity.

   The following list identifies energy sources for refineries. Several of them, including purchased steam, process gas, coke on catalyst and process steam, were not included in the studies. Some of this energy comes from crude oil and some comes from outside sources.

   - Natural Gas – Gas brought into the refinery by pipeline that is largely methane and other hydrocarbons to be ultimately used as fuel in furnaces or process feed for hydrogen plants.

[4] According to U.S. EIA, electricity and natural gas consumption is about 40% of the total fuel consumed in the California (PADD 5) refineries, while fuel-gas alone accounted for about 48% in 2014. NERA report, page 18, footnote 10.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

- Process Gas – Light hydrocarbons, hydrogen and impurities that are produced largely as a byproduct in refinery units.

- Fuel Gas – A combination of process gas and natural gas that is primarily burned in stationary heaters, boilers, and also occasionally used as process feed for hydrogen plants.

- Purchased Steam – Steam transferred into the refinery from external producers.

- Purchased Electricity – Electricity purchased from the grid to supplement self-generated electricity.

- Coke on Catalyst – In a Fluid Catalytic Cracker coke (carbon) deposits on the catalyst are burned off in a regenerator. This generates thermal heat that is used internally within the FCC process and the remainder can be recovered and used elsewhere in the refinery.

- Process Steam – Energy is recovered from the process units to make steam. The steam is used in other parts of the refinery that require energy inputs.

Failure to account for all of these energy sources compounds the studies' underestimation of refinery energy intensity and compromises the integrity of the results for this sector.

On balance, the authors appear to lack confidence in their own results. The UC Berkeley report specifically states that "The imprecision of our estimates makes it difficult to estimate leakage potential for any particular industry with any degree of precision."[5] The Resources for the Future report emphasizes caution when interpreting long run estimates for individual industries, noting uncertainties regarding the sufficiency of historical energy price variation and dynamic decisions about plant investments and closures, and some counterintuitive long run results.[6] We agree with the researchers on these points and assert that the limitations they identify effectively preclude use of the studies to inform Cap & Trade policy decisions.

WSPA Supports the Critical Review Submitted by the California Manufacturers and Technology Association

CMTA recently sponsored a critical review of the leakage risk reports issued by ARB's contractors. This review, conducted by NERA Economic Consulting (*Comments on Cap-and-Trade Program Public Workshop on Emissions Leakage Studies*), identifies a number of deficiencies specific to the petroleum refining and oil and gas industries that render the report findings unrepresentative of actual leakage risk in these industries.

[5] Meredith Fowlie, Mar Reguant and Stephen Ryan (UC Berkeley), Measuring Leakage Risk, pp. 7.
[6] Wayne Gray, Joshua Linn and Richard Morgenstern (Resources For The Future), Employment and Output Leakage under California's Cap-and-Trade Program, May, 2016, pp. 21.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

NERA's findings specific to the refining industry include the following:

- Using data on a large number of industries with heterogeneous characteristics risks confounding the effects of changes in specific markets on those industries with the effects of changing energy prices. "For example, crude oil prices varied widely over the period but their effect on refining is not represented. Thus if crude oil prices were falling during a sub-period when natural gas prices were rising, the regression analysis might conclude that refinery output was relatively insensitive to increases in the prices of natural gas and electricity."[7]

- As noted above, the omission of energy sources consumed at California refineries other than natural gas and electricity (e.g., fuel-gas, petroleum coke, and fuel oil) results in underestimating the energy intensity of those refineries. "To the extent that California refineries are less energy intensive than refineries outside California, this omission leads to an understatement of the leakage that would occur if output from California refineries were displaced by output from refineries outside the state."[8] This omission renders the current analyses in both studies to be inappropriate for the refining section.

- Proper assessment of leakage risk for petroleum refining requires use of process models that capture specific production details. "The combination of low value-added, sunk investments, process plus fuel use emissions and low cost national and international transportation of products make it impossible to capture in a simple econometric model or production function an accurate picture of the regional shifts in refinery activity likely to be caused by California-only carbon policies." NERA indicates that process models can only be used to approximate leakage if they contain data for all competing refineries in the US and overseas, or if they are linked to computable general equilibrium (CGE) models to capture the interindustry and indirect effects of changes in fuel prices and refined product production.[9]

- Regression models are based on past market structure and cannot accurately predict future changes in market behaviour. "As one example, the regression analysis cannot capture the effects of changes in the marketplace that could cause an industry that is currently not trade exposed to become trade exposed. Specifically, the regression model cannot anticipate the future implications of California's shrinking demand for transportation fuels and the pressure this would place on California refineries to sell product to markets outside the state when the refining sector is put into the cap and trade system."[10]

[7] NERA report, page 15.
[8] NERA report, page 15.
[9] NERA report, page 24.
[10] NERA report, page 13.

NERA's findings specific to the upstream oil and gas industry include the following:

- A CGE model could estimate leakage for the upstream oil and gas sector that the regression analyses omit. "Representing these sectors explicitly in a CGE model would be far superior to estimating leakage of these sectors based on estimates derived from other sectors. The CGE analysis should include a number of scenarios in which the assumption about the substitutability of goods produced inside and outside of California and the stringency of California's GHG policy are varied."[11]

- The leakage risk studies are also limited to analysis of manufacturing sectors in NAICS codes 31-33. This narrow scope excludes multiple sectors affected by AB 32 regulations, including the upstream oil and gas sector.[12]

NERA also notes that biases and errors in specification and data lead to counterintuitive results in other industries. For example, the nitrogenous fertilizer industry has a long history of expanding when natural gas prices fall and contracting when prices rise. This is due to the fact that the cost of this homogenous, globally traded commodity is based almost entirely on natural gas prices. However, this industry is identified as only minimally trade exposed.[13] Such findings cast further doubt on the validity of the leakage risk studies and the suitability of these documents as a foundation for Cap and Trade policy setting.

WSPA endorses NERA's findings pertaining to petroleum industry categories and we encourage ARB to carefully consider this paper before proposing any amendments to the Cap and Trade regulation predicated on the UC Berkeley or RFF reports.

As noted above, given the extremely limited time provided to comment on ARB's contractor reports, these comments are necessarily cursory and preliminary. WSPA expects to submit additional substantive comments on these and other related issues in the near future.

While WSPA and its members will continue to comment on various ARB staff proposals as necessary to provide technical input and assistance, WSPA does not believe that AB 32 authorizes the Governor or the ARB to establish a greenhouse gas emissions limit that is below the 1990 level and that would be applicable after 2020. Furthermore, pursuant to California Health and Safety Code Section 38551, ARB may not rely on Executive Orders that purport to extend or expand the scope of AB 32.

[11] NERA report, page 3.
[12] NERA report, page 15.
[13] NERA report, page 27.

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org

WSPA appreciates ARB's consideration of our comments and we look forward to your responses. If you have any questions, please contact me at this office, or Tom Umenhofer of my staff at (805) 701-9142 or email tom@wspa.org.

Sincerely,

cc: Richard Corey - ARB
Edie Chang - ARB
Tom Umenhofer - WSPA

1415 L Street, Suite 600, Sacramento, California 95814
(916) 498-7752 ▪ Fax: (916) 444-5745 ▪ Cell: (916) 835-0450
cathy@wspa.org ▪ www.wspa.org