27 September 2011

California Air Resources Board
Members of the Board of Directors
Mary Nichols, Chair
1011 I Street
Sacramento, California 95814

COMMUNITIES FOR A BETTER ENVIRONMENT

Second Proposed (15-day) Revisions to the AB 32 Cap–and–Trade Regulation

Dear Chair Nichols and Board members,

The Air Resources Board (ARB) proposes to create a pollution trading market that allows companies that pollute for profit—because their main business is fossil fuels—to control the market's data and keep it secret from the public. ARB *cannot know* whether its experiment will reduce greenhouse gas (GHG) emissions overall. However, ARB *does know* that its experiment would enable some polluters in some places to avoid curbing, and even increase, emissions, which could cause significant localized air quality impacts. It would violate environmental rights and laws. Your Staff's claim that direct emissions controls would be less effective is dead wrong. ARB's proposal will result in greater emissions, as these comments will show. We urge the Board to reject this unjust, ineffective, illegal and dangerous cap–and–trade scheme.[1]

1. ARB has not told the public what it is proposing transparently.

ARB proposes to establish a huge financial market in which polluters would buy and sell GHG emission allowances. Each emission allowance would allow and sanction the emission of one metric ton of GHG (1 tonne CO_2e). Polluters would thus be allowed to continue or increase emissions if they buy allowances, which would represent promises to instead reduce emissions elsewhere,[2] and ARB would try to account for all of this everywhere and keep the total emissions from all sources below a slowly declining "cap." ARB now intends that, by 2020, this total emissions "cap" will decline by 7.5% for some industries and by 14.9% for other industries.[3]

Importantly, ARB proposes this pollution trading experiment instead of directly controlling industrial emissions *(Supp. FED)*. Moreover, instead of making every polluter buy an emission allowance for every tonne it emits, ARB proposes to give away emission allowances to many industrial polluters for free *(§§ 95870–95893)*. ARB would give whole industries free emission allowances in various amounts and distribute those allowances to individual facilities in each industry using emission intensity benchmarks.[4] Benchmarks are measurements of other factors that are used to estimate an expected or "baseline" emission rate from each polluting facility.

[1] This is the first of two letters that CBE is submitting on these Second Proposed (15-day) Revisions.

[2] Polluters would also be allowed to pay for emission "offsets" under different specific procedures in the proposal—ARB's proposed pollution trading market is very complicated.

[3] § 95891 Table 9-2. For comparison, the consensus of global climate scientists suggests that, to stablize climate, total emissions must be down roughly 20% by 2020 and more than 80% by 2050.

[4] See: "Assistance Factor" and "Benchmark" terms "AF," "B," §§ 95870, 95891.

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California's oil refining industry stands to benefit financially from this proposal[5] and could get more free allowances than any other industry. ARB proposes to give the refining industry free allowances for 100% of its emissions through 2014, then 75% of its emissions through 2017, then 50% through 2020 *(§ 95870, Table 8-1),* for a total of more than 200 million tonnes of "free" emissions through 2020. The free allowances would be distributed among individual refineries using emission intensity benchmarks intended to give more "complex" refineries (those with more total capacity for processing each barrel of crude refined in multiple different processing units) more free emission allowances.[6] ARB developed these benchmarks and proposes to implement them using industry data that would be kept secret from the public.[7]

These elements of ARB's proposal (cap–and–trade instead of direct control, free allowances, and emission benchmarks) must be evaluated together for two reasons. First, ARB's cap, allowances, and benchmarks interact via mathematical equations *(§ 95891)*. Second, ARB's rationales for proposing cap–and–trade and free emission allowances rely on the same assertion. ARB asserts that both of these elements of its proposal *improve* climate protection because controlling industrial emissions here may have the negative effect of increasing emissions elsewhere so that total emissions are not reduced and may increase. ARB claims this could happen because companies could shift their production outside California instead of cleaning up, and that shift—according to ARB's assertion—increases emissions as much or more elsewhere. ARB calls this "emissions leakage." Citing Health and Safety Code § 38505(J), ARB defines emission leakage as "a reduction in GHG emissions within the state that is offset by an increase in GHG emissions outside the state."[8]

Thus, ARB assigns free allowances to 100% of refinery emissions because ARB estimates a 100% risk that making refineries curb emissions will cause refinery emissions elsewhere to increase as much as or more than those emissions are reduced in California.

Oil refining is the biggest industrial polluter statewide *(Supp. FED at 67)*.

Comments 2–5 herein address these elements of ARB's proposal for oil refineries.

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[5] "Assuming maximum use of offsets, [oil refining] facilities 1 through 7 will benefit from the cap-and-trade program in 2013." *Appendix A to 2nd 15-day Cap–and–Trade Regulatory Text: Refinery Allocation Methodology ("Appendix A")* at 6, see also Figure 3 on page 7.

[6] See: *Disposition of Allowances and Allocation for Industry Assistance* in *Second Notice of Modified Text* at 16–19; §§ 95870, 95891 (esp. tables 8-1 and 9-1; *assistance factor term "AF;" and benchmark term "B"* for petroleum refining and coke calcining activities); *Appendix A;* and *Appendix J to Initial Statement of Reasons* at J-21.

[7] See: *Appendix A* at 7; *Appendix J to Initial Statement of Reasons* at J-43; § 96021 (b).

[8] See: *Appendix J to Initial Statement of Reasons* at J-18, J-19; and *Supp. FED* at 38–75, 110–114 (where ARB claims repeatedly that direct control is less effective than its proposed approach explicitly because it claims such "leakage" will cause equal or greater emissions elsewhere). Footnote 3 in *Appendix A* represents a post-hoc attempt to obfuscate the issue by selectively omitting the environmental impact claim that is central to ARB's actual rationale, which is disingenuous and should be disregarded.

2. ARB allows extremely high refinery emissions and disparately higher exposures to refinery emissions in low income communities of color.

ARB's position that its proposal to allow continuing or increasing refinery emissions will not disparately impact low income communities of color because other existing requirements prohibit increasing GHG-copollutant emissions[9] is disingenuous and wrong. California refinery GHG-copollutant emissions *already* cause disparately high, health-threatening exposures to particulate matter in nearby low-income communities of color *(10, 15)*.[10] ARB allows this disparate impact. It allows extremely high refinery emissions *on average*. By further allowing these high emissions to continue, let alone increase, ARB's proposal would worsen this disparate impact.

Figure 1 shows average production-weighted GHG emissions (lb/barrel crude) in California, other major U.S. refining regions, and Europe.[11] The California and other U.S. emissions are verified based on publicly reported data *(1–3)*.[12] The European emissions are reported as verified by the EU *(4)*. Statewide, average 2004–2008 California refinery emission intensity exceeds that of any other major U.S. refining region by 19–36% and exceeds the average 2005–2008 emission intensity of European refineries by 89–120%.

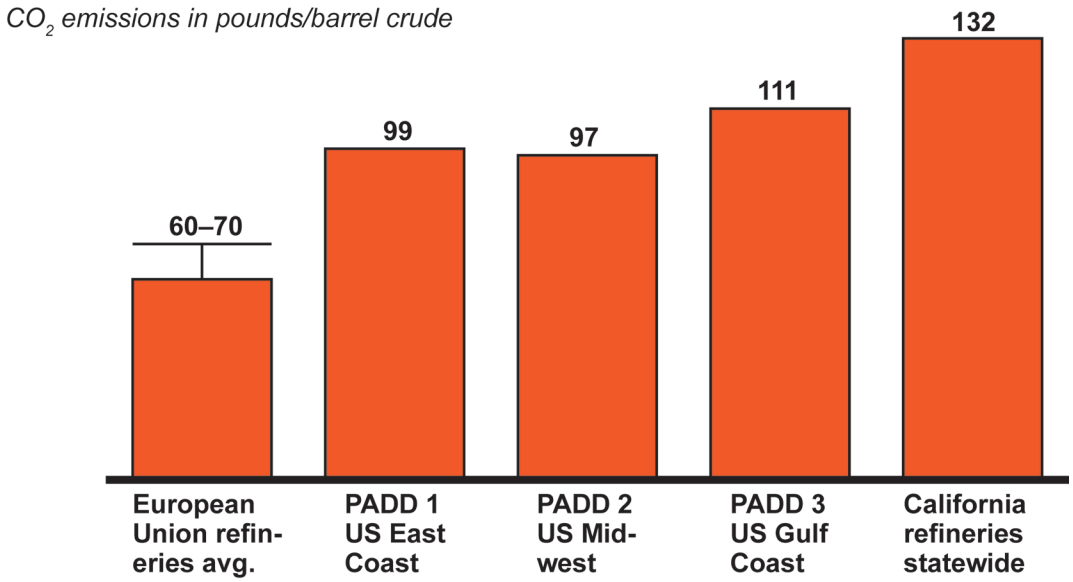


Figure 1. Average refinery emissions intensity by region. PADD: Petroleum Administration Defense District. California and U.S. emissions, 2004–2008, from fuels consumed in refineries including third-party hydrogen production; data given in Attachment 1 to these comments. European Union emissions, 2005–2008, from average of CITL and CONCAWE "verified" emissions *(4)* and crude volume refined in countries included for emissions *(4)* based on 85–100% of crude charge capacities from Oil & Gas Journal *(5)*. The 60–70 lb/b range shown for Europe reflects this 85–100% range in capacity utilization. This bounding range is used because refinery capacity utilization was not reported for Europe.

[9] See: *Supp*. *FED RTC* at 106-69.
[10] ARB admits that such localized air quality impacts could be significant. *Supp*. *FED* at 54.
[11] Research presented in this comment was conducted in part for the Union of Concerned Scientists to develop a benchmark for refineries *(3)*. All conclusions presented herein are those of CBE alone.
[12] These data are given along with detailed documentation in Attachment 1 *(1);* these emission estimates have been peer reviewed for the U.S. PADDs *(2, 3)* and California *(3)* refining regions.

Causal analysis further confirms California's extreme-high average refinery emissions. The quality of crude oil refined is the major driver of differences in average refinery emission intensity nationwide and in California *(2, 3)*. This is because making gasoline, diesel, and jet fuel from denser, higher sulfur crude requires putting more of the crude barrel through aggressive processing that takes more energy and burns more fuel for this energy, thus boosting refinery energy and emission intensities. The impact on energy intensity is illustrated in Figure 2. Crude feed density and sulfur content can explain 90–96% of increasing CO_2 emissions from the lowest to highest emitting refineries across the U.S. and California, and predict the extreme-high 2004–2009 average emission intensity of California refineries within 1% (2, 3).

Figure 2. Refinery energy intensity *(EI)* predicted by crude feed density and sulfur

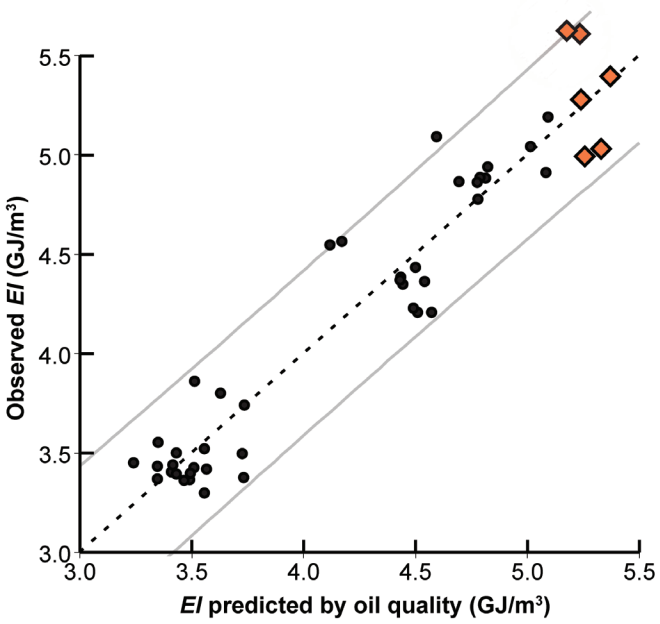
Prediction for California refineries on 1999–2008 data from U.S. refineries

R^2 0.90

Diagonal lines bound the 95% confidence of prediction for observations

Figure adapted from Figure 1 in *Env. Sci. Technol.* 44(24) 9584–9589; DOI 10.1021/es1019965; American Chemical Society

Calif. data from Attachment 1 *(1)*



Thus, the high emission intensity of California refiners is because refining lower quality crude increases refinery energy intensity *(Figure 2)*, so that they burn more fuel per barrel refined. The average California refinery crude feed is denser than that of any other major U.S. refining region *(1, 3)*. Indeed, ARB now admits to the higher average emission intensity of California refineries, and crucially, ARB also admits to the more "complex" refinery configurations that are needed to process California refineries' denser average crude feed.[13]

Putting a larger share of this denser, "dirtier" crude through agressive processing requires a refinery's "primary" processes—those that act on the denser, dirtier oils from crude—to be bigger, relative to the size of its initial atmospheric crude distillation unit *(2, 3)*. On average, California refiners' primary processing (vacuum distillation, coking, cat-cracking, hydrocracking and gas oil hydrotreating) equivalent capacity is much greater than that of other major U.S. refining regions *(3)*. ARB refers to this greater capacity as additional refinery "complexity." The additional complexity that *enables* refining "dirtier" crude *enables* the high refinery emission intensity that worsens environmental injustice in our communities.

[13] *Supp. FED RTC* at 106-67, 106-68.

3. ARB's refinery emission intensity benchmark proposal allows and perversely supports a further increase in California's already-high refinery emissions.

ARB now proposes "benchmarks" designed by oil industry consultants to assign higher emission expectations to more "complex" refineries with more capacity to further process the oils from their initial crude distillation.[14] ARB's refinery "complexity" benchmarks are a polluter's dream. They are designed to reward the refining practice that boosts emissions the most. They artificially make the resultant high refinery emission intensity look like "good" environmental performance. They keep data secret so that refineries can hide their polluting practices from the public.

Benchmarking emissions against refinery complexity predicts very high average emissions for California refining based on its very high primary processing equivalent capacity *(Figure 3)*.

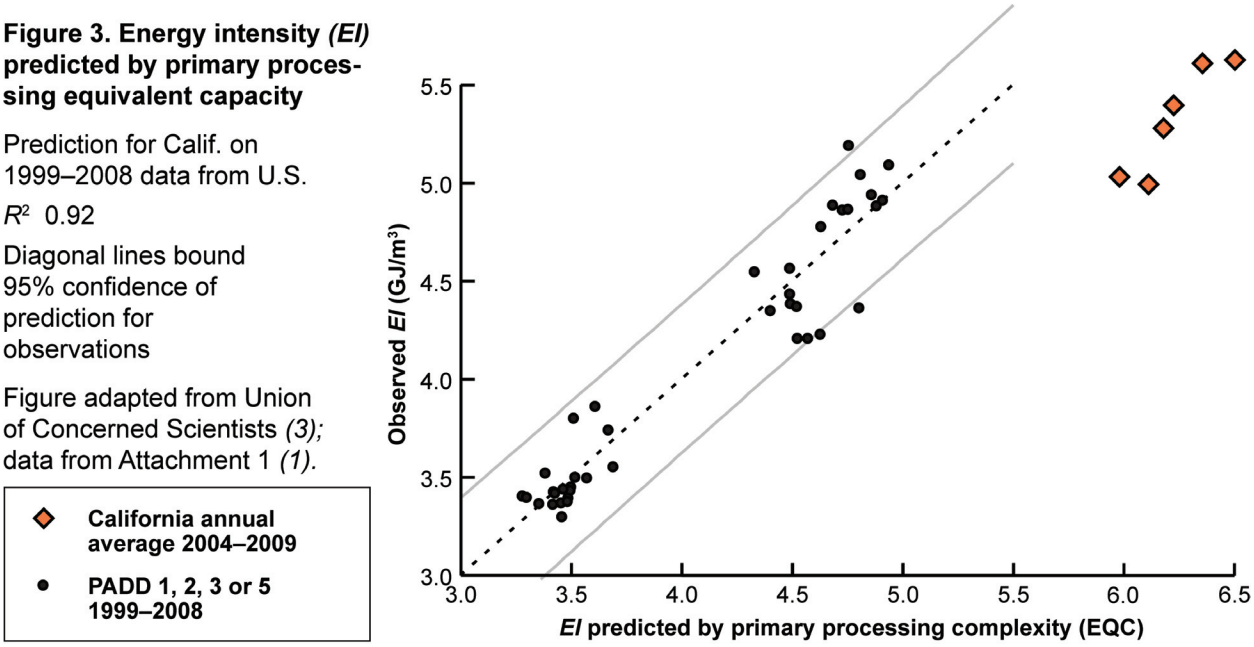
Figure 3. Energy intensity *(EI)* predicted by primary processing equivalent capacity

Prediction for Calif. on 1999–2008 data from U.S.

R^2 0.92

Diagonal lines bound 95% confidence of prediction for observations

Figure adapted from Union of Concerned Scientists *(3)*; data from Attachment 1 *(1)*.



This prediction *(Figure 3)* makes sense because primary processing capacity enables refining dirtier crude, which is the main driver of refinery emission intensity *(2, 3)* as discussed above. Further, the over-prediction of California refinery emissions by this complexity benchmark (California data are shifted to the right in Figure 3 as compared with Figure 2) makes sense because California refineries use much more gas oil hydrotreating to pretreat catalytic cracking feeds than other regions on average *(1, 5)*. By treating more of the oil before cat-cracking (and reforming) it in this way, California refineries could reduce the energy and emission intensities of those other individual processes marginally *(3)*. That would cause their total refinery emissions to be slightly lower than predicted by nationwide refinery complexity data *(Figure 3)* even though

[14] These are first a benchmark proposed by the Western States Petroleum Association based on the Solomon EII; and from 2015 onward a "Carbon-weighted-tonne" benchmark from the EU, based on the Solomon CEI, and ultimately based on the EII: both benchmarks are thus based on refinery "complexity." *Second Notice of Modified Text at 16–19; §§ 95870, 95891 (esp. Table 9-1 and benchmark term "B"); Appendix A; Appendix J to Init. St. Reasons* at J-21; *References 4, 7–9*.

their emissions stay right in line with those predicted by their more energy-intensive, lower quality crude feeds *(Figure 2)*. The result is that ARB's benchmark, which compares actual refinery emissions only to the diagonal lines in Figure 3 that it predicts based on complexity, and is blind to whether actual emissions are higher or lower than those of other refineries in this chart, predicts California refinery emissions that are even higher than their extreme-high actual levels.

The trick in ARB's proposal is that it turns this limited and partly inaccurate complexity-based prediction into a *performance expectation* that assigns *more* emissions allowances to more complex refineries.[15] ARB's benchmark could thereby tell ARB to *expect* even higher emissions than those observed in California, and artificially assign "better than expected" emissions performance to the highest average refinery emission intensity in the country.

Worse, because increasing primary processing capacity enables refining lower quality crude *(2, 3),* by awarding more free emission allowances to more complex refineries with expanded capacity to process this inherently dirtier crude, ARB would encourage the very same refining practice that increases refinery emissions the most.

Our summary of crude quality and processing intensity impacts on refinery energy and emission intensities here is based on peer reviewed work that accounted for and verified the relationships of these factors and also other refinery processing, product slates, and fuels burned for energy in refineries, using data from operating plants across 97% of the U.S. industry *(2),* and extended the same methods to California-specific data *(3)*. ARB's erroneous claim that this work does not account for impacts of processing capacity and product slates *(Supp. FED RTC at 106-67, 106-68)* should be corrected for the record, and further suggests a key weakness in the agency. It suggests that ARB misunderstands the major cause of the extremely poor emission performance it has allowed across the highest-emitting industry in California. ARB's weakness will be compounded if critical data for assessing refinery emissions performance are kept secret.

Yet ARB proposes exactly that. It would allow oil companies to keep the data used to develop and implement its benchmarks secret from the public.[15] This could make it virtually impossible for the public or any entity that does not have a vested interest in ARB's emission trading market to effectively participate or check on the actual operation of its huge experiment upon which our climate and future might depend. Low income communities of color that are disparately exposed to refinery GHG-copollutants <u>now</u> *(10, 15)* would be prevented from knowing and acting on the information ARB and individual refineries would negotiate over to decide how much we would be further poisoned. Already, ARB proposes to give oil companies more than 200 million tonnes of emission allowances that might be worth billions of dollars for free based on these secret data. The secrecy is not necessary because there is a more accurate alternative benchmark that need not be based on secret data *(2, 3, Figure 2)*. Adopting this emission data secrecy would violate fundamental scientific principles, basic public policy principles, and environmental rights—and may violate the law.

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[14] *Second Notice of Modified Text at 16–19; §§ 95870, 95891 (esp. Table 9-1 and benchmark term "B"); Appendix A; Appendix J to Init. St. Reasons* at J-21.

[15] *Appendix A* at 7; *Appendix J to Initial Statement of Reasons* at J-43; § 96021 (b).

4. ARB's refinery proposals would result in drastically increased emissions, significant and disparate impacts on environmental health, and significant cumulative and irreversible impacts on future generations' ability to avert catastrophic climate disruption.

ARB's proposals come at the worst time. California refineries are beginning a major crude supply switch now *(11–13)*.[16] Only about 25–30% of their crude feed will be from existing sources of California production by 2020 *(3)*. This means they will retool for different "new" crude oils—and lower quality crude is cheaper. They will target the highest-profit balance between cheaper feedstock, and the costs and liabilities of adding capacity for and refining dirtier crude. But ARB would protect them from liability for their pollution with emission allowances that are free now and cheaper than the profits from dirtier crude later,[17] and subsidize retooling for lower quality oil with benchmarks that give more allowances to refineries with more capacity to process it. ARB's cap–and–trade scheme, free allowances and benchmarks would thereby allow, support, and ensure a switch to refining "dirtier" oil. That oil could be much dirtier *(Figure 4)*.

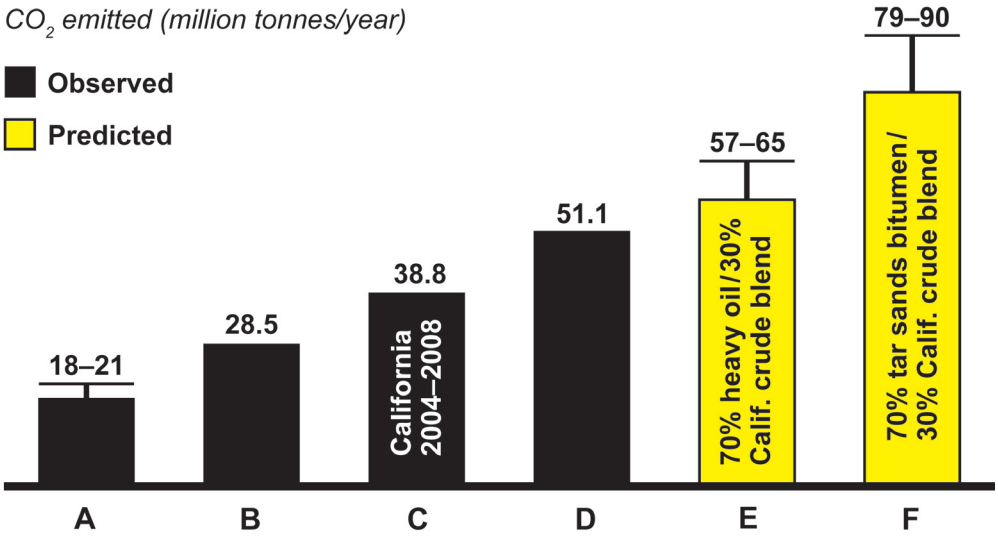

Figure 4. Refinery mass emissions from California's current production rate at observed and predicted potential refinery emission intensities. All emissions shown for the California statewide average crude input observed 2004–2009 (647.44 MM barrels/yr) *(1)*.
A: European Union refineries average emission intensity observed 2005–2008 *(4, 5, Figure 1)*.
B: U.S. Midwest PADD 2 refineries average emission intensity observed 2004–2008 *(1, Fig. 1)*.
C: California statewide refineries average emission intensity observed 2004–2008 *(1, Figure 1)*.
D: Emission intensity based on 2008 data reported by Shell Martinez refinery *(Att. 1 Table 2-6)*.
E: 95% confidence of prediction for 70% heavy oil/30% California-sourced crude feed *(Att. 2)*.
F: 95% confidence of prediction for 70% natural bitumen/30% Calif.-sourced crude feed *(Att. 2)*.
Emissions in the E–F range are foreseeable if current, declining Calif. production is replaced by low-quality crude. Predictions based on the average density and sulfur content of heavy oil, natural bitumen *(2)* and 2004–2009 California crude production *(Att. 1, Table 2-3)* by the method from Karras 2010 *(2)*.

[16] ARB admits that "California's historic crude supplies are changing as the State's internal production declines and as crude supplies from Alaska also decline" *(Supp. FED RTC at 106-68)*.

[17] At the 1983–2009 average discount on heavy oil over 30–35 °API crude (~ $4/barrel), going to this much higher-emitting oil could boost refiners' profits by several times any price ARB has talked about putting on the resultant emissions *(CBE comments on Supp. FED at 56, 57)*.

Recent work found a switch to dirtier crude could double or triple refinery emissions *(2)*. Figure 4 shows some of that potential has been realized, and applies the prediction method from this peer reviewed work to the California crude switch. Because crude quality is the major driver of refinery emission intensity *(2, 3),* the emissions increment will depend on how far refiners shift the 70–75% of their feed that will no longer be from existing California sources of production toward the densest, dirtiest oils.[18] Replacing 70% of their crude feed with the average "heavy oil" as defined by USGS *(14)* could increase statewide refinery emissions by 18–26 million tonnes/year (Column E). Though huge, this emission intensity increment is already approached by least one California refinery (Column D)[19] and represents the low end of the potential to pollute.

Replacing that same 70% of California refinery crude feed with the average-quality natural bitumen *(14)* could boost emissions by 40–51 million tonnes/year (Column F). This worst-case scenario is plausible to the extent that ARB finds it cannot monitor and control production activities in other nations,[20] especially if the planned Alberta–British Colombia tar sands pipeline and port expansions are built. The dirty oil switch would most likely include some combination of heavy oil and tar sands inputs—which would emit somewhere between the low and high cases[21] shown by columns E and F in Figure 4.

Other existing policies will not prevent this crude quality-driven emissions increase. This is starkly evident in the extreme-high average refinery crude feed density and emissions that these policies allow on ARB's watch *(1, 3, figures 1, 4)*. But ARB's claim that existing controls on "criteria" pollutants will prevent a crude quality-driven emissions increase[22] is both wrong and specious. By using up the limited remaining capacity of emissions capture technology, the crude switch that ARB would allow would foreclose otherwise available emission reductions.

Thus, ARB's proposal is likely to increase California refinery emissions by some 18–50 million tonnes/year. Even the low end of this estimate could overwhelm other planned efforts here and—if copied elsewhere—impede or foreclose the total cut in emissions from all sources that is needed to avoid severe climate disruption *(2, 3)*. Since burning more fuel to refine low quality oil emits toxic and smog-forming combustion products along with CO_2 *(2),* it would worsen existing disparately high exposures to harmful refinery GHG-copollutants in low income communities of color *(10, 15)*. The sunk costs invested in refinery capacity tooled for dirtier crude would commit us to those emission increments for decades *(16)*. Impacts on climate from those decades of

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[18] CBE does not assert a 100% switch by 2020 as ARB implies *(Supp. FED RTC at 106-68)*.

[19] This detail further confirms the crude quality impact: Column D emission intensity was observed at the Shell Martinez plant, which runs a denser crude feed than the California average. In addition to explaining and predicting emission intensity across major U.S. refining regions and California *(2, 3),* crude feed density and sulfur content predict this plant's high emissions *(3)*.

[20] ARB has no clear authority to access and check actual production activities in other nations and no budget to send its staff and do so. Yet ARB's Low Carbon Fuel Standard (LCFS) fails to monitor or control refining characteristics of crude at the point where it enters processing in California refineries. ARB's LCFS provides no reliable backup for the failures of its cap–and–trade proposal in this regard.

[21] This estimate is consistent with that made for 70% heavy oil in CBE's 28 July 2011 comments and adds information: the whole range of potential to pollute; the 95% confidence of prediction; and comparison of future emissions with a more reliable baseline estimated from multiple years.

[22] *Supp. FED RTC* at 106-69.

added CO_2 emissions would be cumulative over generations *(17, 18)*. Therefore, ARB's proposal would result in significant and disparate impacts on environmental health in low income communities of color, and significant cumulative and irreversible impacts on future generations' ability to avert catastrophic climate disruption.

5. Newly disclosed facts prove that ARB's basis for exempting California oil refineries from emissions control measures cannot possibly be valid.

As described above, ARB's rationales for proposing cap–and–trade and free emission allowances rely on the assertion that controlling industrial emissions here could shut down production here and increase emissions elsewhere so that total emissions are not reduced.[23] ARB maintains this "emissions leakage" assertion at the same time that it accepts the higher emission intensity of California refineries, the crude quality-driven cause of higher refinery emissions here, and the ongoing California refinery crude supply switch documented above as true.[24] ARB ignores what these newly disclosed facts mean about its comparison of climate protection alternatives.

California refineries could achieve the lower emission rates achieved *on average* in other major U.S. refining regions by switching to crude feed of the quality refined across these other major U.S. refining regions today *(see figures 1–4)*. California refineries must adjust to a changing crude supply anyway. They can be required to adjust to a less-dirty crude supply instead of an inherently dirtier one. The only reason they might not (and those elsewhere might "catch up" to their pollution rate) would be if refineries are *allowed* to pollute in violation of environmental rights, and *that* policy would clearly be improper, so it would be an invalid rationale.

Thus, other major U.S. refining regions achieve lower emission rates by doing what can be done here while continuing production, in direct contradiction to ARB's claim that refiners here would shut down production instead of cleaning up.[25] Together with the product transport and marketing logistics that drive refineries to be near their markets rather than their crude supplies in general—and insulate California refiners from competitors who would have to ship across the Rocky Mountains or the Pacific in particular—this proof that other refineries continue production while achieving lower emission rates debunks ARB's emissions leakage claim.

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[23] See: *Appendix J to Initial Statement of Reasons* at J-18, J-19; and *Supp. FED* at 38–75, 110–114 (where ARB claims repeatedly that direct control is less effective than its proposed approach explicitly because it claims such "leakage" will cause equal or greater emissions elsewhere).

[24] ARB states in part: "The commenter claims that California refineries emit more GHG emissions per barrel of crude refined than other U.S. refineries … . The commenter's premise—that heavier, higher sulfur crudes require more energy to refine, and therefore result in higher GHG emissions per unit of output—is valid. Because much of the State's crude is heavy … and Alaskan crude is also relatively heavy and higher sulfur, California refineries have been configured to handle a tougher-to-refine mix of crude oils than those elsewhere in the U.S. The commenter also correctly notes that California's historic crude supplies are changing as the State's internal production declines and as crude supplies from Alaska also decline. … On average, California refineries are far more complex … a much higher fraction of refineries in other parts of the U.S. are lower-complexity refineries, which use much less energy per barrel refined (and therefore have lower GHG emissions)." *Supp. FED RTC* at 106-67, 106-68.

[25] From 2004 onward, annual data are in the same range in U.S. PADDs 1–3 and California for both refinery capacity utilized (80–95%), and combined gasoline, distillate and jet fuel yield on crude (79–87%); and total gasoline/distillate/jet product output declined with softened demand due to the economic recession only 4.6% across PADDs 1–3, versus 5.5% in California *(1)*.

Moreover, even *if* California refineries reduced emissions by reducing production *and* this caused refineries elsewhere to increase production by the same amount to supply constant demand here, the "reduction in GHG emissions within the state that is offset by an increase in GHG emissions outside the state" asserted by ARB's emissions leakage claim is mathematically impossible.[26] California refining emits more GHG per barrel: shifting its production to other regions would reduce total emissions. Based on the data in Figure 1, a barrel-for-barrel production shift from California to the Midwest, or to Europe, cuts bi-regional refinery emissions by 26%, or 47%, respectively.

Newly disclosed facts that ARB accepts as accurate prove ARB's assertion of refinery emissions leakage risk is false. ARB's decisions to apply its cap–and–trade scheme to refineries and to give refineries free emission allowances instead of reducing their emissions more effectively through direct control measures rely upon this false emissions leakage assertion. Therefore, ARB's decisions to develop and propose a cap–and–trade scheme instead of direct industrial emissions control measures and to give refineries free emissions allowances instead of controlling their emissions are based on factual findings that are false and are invalid.

Respectfully submitted 27 September 2011

Greg Karras
Senior Scientist

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Senior Attorney

[26] This scenario is extremely unlikely because refineries continue production at lower emission rates, California refiners are insulated from competition by the Rocky Mountains and Pacific Ocean, and ARB's Low Carbon Fuel Standard should reduce demand for refined transport fuels. But even if it did occur, a bi-regional refinery emissions increase is impossible in any valid policy scenario. As noted above, assuming refineries elsewhere will be allowed to violate environmental rights in order to profit by "catching up" to California refineries' use of cheaper, dirtier, higher-emission feedstock is not a valid basis for policy.

References cited

1. Attachment 1 to these comments: unless otherwise noted, see esp. Table 2-1.

2. Karras, 2010. Combustion emissions from refining lower quality oil: What is the global warming potential? *Env. Sci Technol*. 44(24): 9584–9589. DOI 10.1021/es1019965. Main text and all Supporting Information freely available at http://pubs.acs.org/doi/abs/10.1021/es1019965; previously provided to ARB and hereby incorporated in and attached to this comment electronically.

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5. *OGJ surveys downloads;* PennWell: Tulsa, OK, 2011. 2004–2010 Worldwide refining, *Oil & Gas J*. Web site; www.ogj.com/index/ogj-survey downloads.html; accessed May 2011.

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