

December 14, 2010

Mary Nichols, Chairman
James Goldstene, Executive Officer
California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812
Via email: mnichols@arb.ca.gov, jgoldstene@arb.ca.gov

Re: CBE Comments on Draft Cap and Trade Regulation: Draft Cap & Trade Regulation Misses California GHG and Pollution Reduction Opportunities, Job Opportunities, and Contains Egregious Errors

Dear Chairman Nichols and Mr. Goldstene,

In our October and December 2008 comments on ARB's Scoping Plan, Communities for a Better Environment raised numerous substantial concerns and described the significant pitfalls of cap and trade schemes. We specifically described why cap and trade programs do not work to significantly reduce greenhouse gas emissions and how they harm low-income communities and communities of color. ARB did not respond to these concerns. Indeed the proposed regulation would animate some of CBE's greatest fears.

Overwhelmingly, cap and trade programs suffer from credit overallocation, monitoring and equivalency problems, loss of innovation, unverifiability of offsets, unverifiable accounting practices, and lack of additionality. Cap and trade schemes also exacerbate environmental injustice by increasing hotspots, creating price volatility, and leading to oppression through high risk and fraudulent offset projects that too often also result in displacement. The proposed regulation does nothing to avoid the known pitfalls inherent to cap and trade.¹ Instead, the regulations bend over backwards to accommodate polluters' desire for zero cost compliance, ease and flexibility at the expense of true significant reductions, health protection (avoiding increases in other pollution), and environmental justice. It also used a flawed calculation of emissions as the foundation for

¹ For more information on these issues, please see further exploration and elaboration in comments written by the Center on Race, Poverty & the Environment and cosigned by CBE.

all of its estimates. Throughout its pages, the proposed regulation violates the letter and spirit of AB32.

AB32 specifically requires that ARB “ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities.”² The regulations may not “interfere with efforts to achieve and maintain federal and state ambient air quality standards to reduce toxic air contaminants,”³ must minimize leakage,⁴ “consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, the environment and public health”,⁵ and “consider the significance of the contribution of each source or category of sources to statewide emissions of greenhouse gases⁶. But if ARB adopts a cap and trade program, AB32 additionally requires ARB to affirmatively “design” the program “to prevent any increase in emissions of toxic air contaminants or criteria pollutants,”⁷ consider direct, indirect and cumulative emission impacts from the program, and direct private and public funds to disadvantaged communities.⁸ The proposed regulations overwhelmingly ignore these requirements, and ARB’s failure to analyze reasonable alternatives makes adoption of the draft regulations even more irrational.

The comments below find:

- **Industrial GHG emission sources are massive** (largely oil industry emissions), but still underestimated in CARB documents
- **Despite the volume and toxicity of industrial co-pollutants (especially oil industry), there are zero tonnes of direct controls required for this source** – all are allowed to be completed through buying pollution credits from outside any particular industry, and carried out outside California or the U.S.
- **Furthermore, industrial sources are not required even to buy credits under the proposal** – they are 100% free.
- **Large California NOx, CO, and other co-pollutant reductions can be achieved if an alternative is adopted requiring direct control measures⁹**

² H&S Code § 38562(b)(2).

³ H&S Code § 38562(b)(4).

⁵ H&S Code § 38562(b)(6).

⁶ H&S Code § 38562(b)(9).

⁷ H&S Code § 38570(b)(2).

⁸ H&S Code § 38565.

⁹ Termed by CARB as measures “complementary” to Cap and Trade, and agreed by CARB and other agencies to be key for overall success of the program.

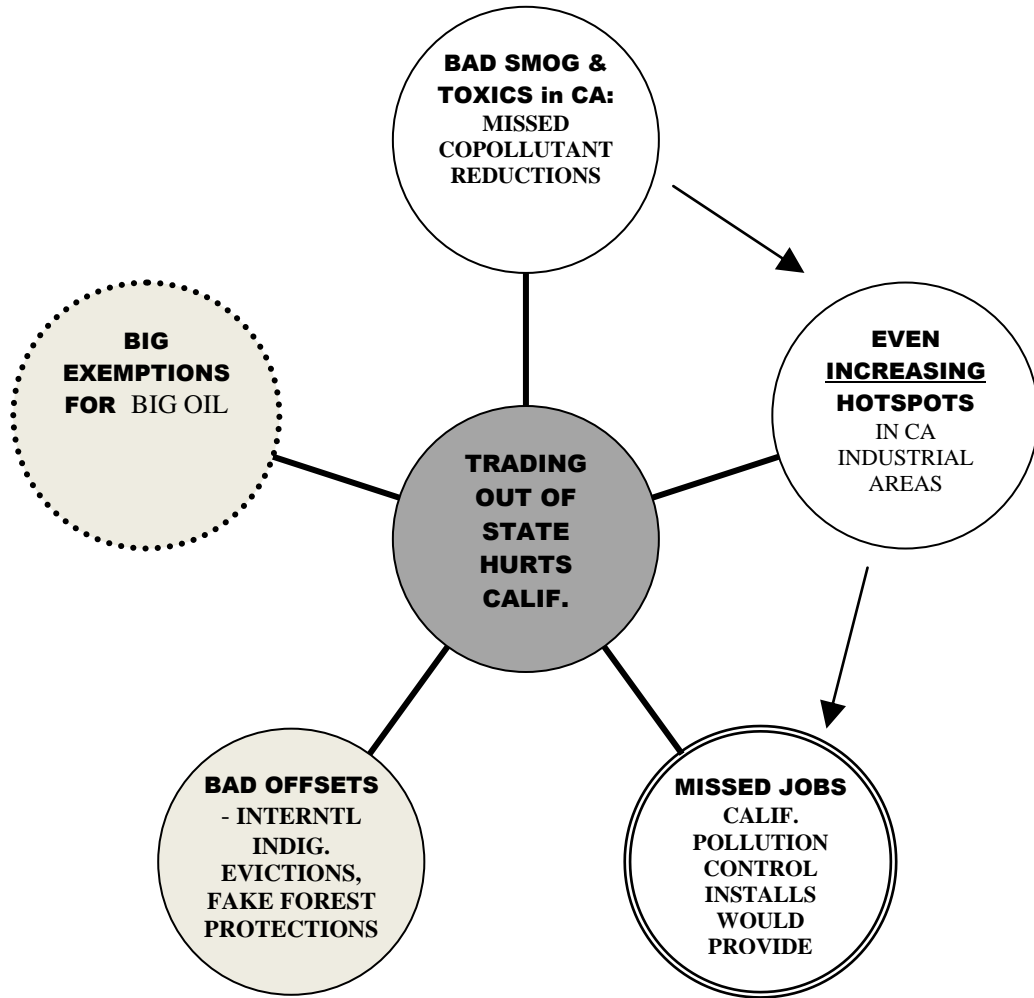
using methods known by CARB (e.g. for boilers and heaters). These co-pollutants otherwise cause large cumulative impacts in communities of color. Similarly CARB should evaluate other co-pollutants including pm2.5 and toxics which feasible direct controls would achieve. AB32 requires addressing the co-pollutants issues, but the proposed Cap and Trade regulation and Scoping Plan do not.

- **Such project alternatives just described would create California jobs, California health improvements**, and the best model for regions outside California to replicate. They were not considered. Cost effectiveness calculation of such controls should include the benefits of reducing GHGs, reducing smog and toxics, and reducing health impacts.
- **The current project not only misses these opportunities, but allows harms to California**, for instance, by allowing increasing industrial pollution in heavily industrialized California communities, and by causing evictions of indigenous people through fake forest offset projects.
- **Outright exemption from regulation is provided for large portions of oil refinery sources**, which must also be removed (see below).
- Available measures for industrial sources that should be added, include:
 - Implementing **industrial boiler and heater replacement** listed by CARB in the published spreadsheets
 - **Removing methane exemptions** present in California smog regulations, which will reduce both GHGs and regional smog co-pollutants.
 - Requiring implementation of specific refinery by refinery measures identified in the **industrial energy efficiency audits**
 - **Limits on the use of dirty crude oil**, which is similar to what the electric power industry must meet.
 - **A thorough evaluation of Reasonably Available Control Measures** at oil refineries and industrial sources, minimizing both GHGs and co-pollutants
 - Additional measures discussed in this document
- **CARB originally considered direct control of oil refinery reduction measures and found them feasible**, but later lumped oil refineries and industrial sources in with all other Cap and Trade sources, despite findings that direct controls were

feasible. If CARB made these fixes for industrial sources and as well for other sources causing health impacts in California (such as agricultural and electrical sources), the severe impacts caused by Cap and Trade, and the ineffectiveness of it, would be greatly lessened.

- **CARB must include a strategy to implement the requirement to direct monetary benefits to disadvantaged communities.**

Overview of Cap & Trade harms:



I. Cap & Trade Industrial GHG reductions are tiny & can be beefed up; if instead achieved in-state, they would generate local jobs, health benefits, and be verifiable

A. Industrial emissions, especially oil industry, are big but underestimated

The success of cap and trade programs is dependent on identifying the correct number of reductions needed, requiring those reductions, and setting a low enough cap, but CARB systemically miscalculates industrial emissions, making it difficult or impossible to verify reductions in comparison to the targets and initial allocations.

Moreover, AB32 requires ARB to adopt regulations to achieve the maximum technologically feasible GHG reductions from sources and categories of sources.¹⁰ Here, GHG industrial sources are very large, but reductions in the proposed Cap and Trade plan, especially for oil refineries, are miniscule, despite many available options for reductions. Total emissions from the capped portion of this sector were found by CARB at 75.69 million metric tonnes CO2 equivalent (or MM tonnes CO2e) in 2008. An excerpt from CARB's document *2020_ghg_emissions_forecast_2010-10-28* (attached), last updated 10/28/2010 shows the large contribution of different industrial subsectors to California (shown projected without Scoping Plan reductions):¹¹

Category	2008	2009	2010	2011	2012
Grand Total	474.64	457.65	462.04	463.23	470.37
Industrial (Capped)	75.69	74.15	73.26	73.42	73.66
Cement Plants	8.64	8.64	8.64	8.64	8.64
Cogeneration Facilities	11.13	10.37	10.02	9.87	9.81
Hydrogen Plants	2.22	2.20	2.18	2.18	2.18
Petroleum Refining	34.58	34.24	33.89	33.89	33.87
Other	0.21	0.20	0.20	0.21	0.22
General Stationary Combustion	18.91	18.50	18.32	18.63	18.94

2013	2014	2015	2016	2017	2018	2019	2020
480.40	487.35	492.01	494.66	497.88	500.76	503.76	506.78

¹⁰ H&S Code §38560.

¹¹ *California GHG Emissions - Forecast (2008-2020)*, 10/28/2010, *2020_ghg_emissions_forecast_2010-10-28*, http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf

74.03	74.10	74.12	74.17	74.20	74.20	74.21	74.21
8.64	8.64	8.63	8.63	8.63	8.63	8.63	8.63
10.08	10.27	10.46	10.65	10.83	11.01	11.19	11.38
2.18	2.18	2.17	2.17	2.17	2.17	2.17	2.17
33.85	33.82	33.80	33.77	33.75	33.72	33.69	33.66
0.23	0.23	0.23	0.24	0.24	0.24	0.25	0.25
19.06	18.97	18.83	18.70	18.57	18.43	18.28	18.13

The table shows industrial emissions at about 74 MM tonnes CO₂e from 2008 to 2020. Oil refineries, the largest industrial subsector, is shown at about 34 MM tonnes CO₂e over this period. The whole industrial sector in fact is even larger when uncapped industrial sources are included. Another CARB chart (*Gross emissions and sinks* excerpted below) provides the total for all industrial sources at about 100 MM tonnes CO₂e.

Oil industry sources are even bigger than they appear, because the listings split them into separate categories, with some categories not clearly labeled. Oil refineries should be added to Hydrogen Plants (which produce hydrogen at oil refineries for oil refinery use, by burning fossil fuels), and added to a large portion of the Cogeneration total, since large numbers of cogeneration comes from oil refinery sources.

It appears that another hidden oil industry source is also contained under the label “General Stationary Combustion.” This can be determined by reviewing the CARB table below. “Oil & Gas Extraction” at 17.04 MM apparently makes up most of the 18.91 MM tones of “General Stationary Combustion.” Because the oil industry is not only a major contributor to GHGs and toxics, the breadth of the oil industry sources should be made clear in the inventories.

California Greenhouse Gas Inventory for 2000-2008 — Summary by Economic Sector¹²

¹² http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_sector_00-08_sum_2010-05-12.pdf

<i>Gross emissions & sinks</i>	<i>2008</i>
Industrial	100.03
<i>CHP: Industrial</i>	10.47
<i>Landfills</i>	6.71
<i>Manufacturing</i>	22.47
<i>Mining</i>	0.19
<i>Not Specified Industrial</i>	2.24
<i>Oil & Gas Extraction</i>	17.04
<i>Petroleum Marketing</i>	0.00
<i>Petroleum Refining</i>	35.60
<i>Pipelines</i>	2.62
<i>Wastewater Treatment</i>	2.70

This puts the oil industry sources in the CARB documents at:

- Oil refineries 34 MM tonnes
- + Hydrogen plants about 2MM tonnes
- + Oil and gas extraction at 17 MM tonnes
- + Cogeneration -- some large portion of 11 MM tonnes

= about 55 to 60 MM tonnes from the oil industry,
currently required to achieve zero direct emission reductions

Even this large sum of emissions is an underestimation.

Hydrogen Plant emissions are underestimated:

For example, hydrogen plants at oil refineries are growing at a fast rate, in order to allow refineries to process heavier, more contaminated crude oil. Just one hydrogen plant can emit over a million tonnes per year of CO₂e (such as at the ConocoPhillips Rodeo facility¹³), so it is almost certain that the total of 2.22 MM tonnes listed for hydrogen plants now is actually much higher and getting even bigger than listed in the CARB chart.

CBE has previously provided a partial list of additional hydrogen plant projects in comments to CARB, and we incorporate those by reference. CBE also previously requested that CARB perform a more detailed assessment of planned hydrogen plants expansions at refineries, and we included the following chart in both written comments

¹³ Excerpt of ConocoPhillips Rodeo Refinery Clean Fuels Expansion Project, Final Environmental Impact Report, Volume 1 – Response to Comments, cover and table of GHG emissions, Attachment CBE 1 - ConocoPhillips Rodeo H2 Plant GHGs

submitted,¹⁴ and in testimony at a CARB hearing. This chart shows that just due to new hydrogen plants added, or in the process of being built, in the last decade, about 6 million tonnes per year of CO2 emissions were added.. This is a continuing trend that needs to be reigned in; it is caused by huge GHG increases that appear not to be accounted for by CARB, as well as by big local pollution increases during these oil refinery expansions that are occurring for the purpose of switching to heavier, more contaminated, cheaper crude feedstocks at oil refineries.

Examples of CA Refinery Hydrogen Plant Expansions (not comprehensive) (million standard cubic feet)	Approximate CO2 Emissions (metric tonnes /yr)
2007 ConocoPhillips Rodeo --120 MMscf	at least 1,250,000
2007 Chevron Richmond -- 100 MMscf	at least 900,000
2007 Valero Benicia – unknown MMscf	≈ 860,000
2003 Chevron El Segundo -- 90MMscf	≈ 940,000
1999 Air Products Wilmington for area refineries -- 96 MMscf	≈ 1,000,000
1996 Air Products for Ultramar, Wilmington --83 MMscf	≈ 860,000
493 MMscf (million standard cubic feet)	Almost 6 million metric tons per year

Furthermore, GHGs from oil refineries overall are getting worse due to switches to dirtier crude oil, running counter to other industries (such as electric power plants), which are switching to lighter feedstocks. The recent peer-reviewed study published by CBE Senior Scientist Greg Karras in the journal *Environmental Science and Technology*¹⁵ found that very large increases in GHG emissions are occurring due to the switching to dirtier crude oil at oil refineries, underlining the importance of accurate inventories and

¹⁴ Attachment C -- Comments on CARB AB32 Scoping Plan, Oil Refineries, by CBE (part of a 3-part comment by EJ groups, previously submitted to CARB, May 2008, attached, Attachment CBE 2 – Previous CBE Comments May 2008

¹⁵ *Combustion Emissions from Refining Lower Quality Oil: What Is the Global Warming Potential?*, *Environ. Sci. Technol.*, 2010, 44 (24), pp 9584–9589, DOI: 10.1021/es1019965, November 30, 2010, Copyright © 2010 American Chemical Society <http://pubs.acs.org/doi/abs/10.1021/es1019965>, Attachment CBE 3 – GKarras Environ Sci Technol paper High GHGs Dirty Crude

forecasts, and controls and limits addressing this switch. While CBE has testified on this issue to CARB for a number of years, and CARB is well aware of this general trend, the new study provides a detailed evaluation of data nationally, which shows in detail how sharp this increase is. The paper found: *“Fuel combustion increments observed predict that a switch to heavy oil and tar sands could double or triple refinery emissions and add 1.6–3.7 gigatons of carbon dioxide to the atmosphere annually from fuel combustion to process the oil.”* We urge CARB to review the attached publication, and to address this issue.

Pressure for growth in polluting oil refinery cogeneration of electricity

In addition, oil refineries have pushed for subsidized cogeneration, a truly bad idea, which would replace clean energy electricity, with oil refinery-generated electricity. While industrial energy efficiency is essential, and while existing refinery processes should be required to capture waste heat, adding unneeded, expanding oil refinery electricity is directly counter to the RPS (Renewable Portfolio Standard), which is aiming at converting fossil fueled electricity into clean electricity. **CARB must not allow oil refinery-generated electricity to subvert this process and take us backwards.**

Large portions of refineries have been removed from regulation by redefining them as non-refineries

Even the seemingly straightforward category of “oil refineries” is being parsed into bits, with oil refineries that process intermediate materials being exempted, and even removed from the definition of oil refineries in the regulation, despite the fact that they are inherently part of an oil refining company’s overall production process. It is unclear whether the re-defined refinery portions are included in the capped emission estimation of 34 MM tonnes or not, but it is clear they are exempted from the caps. This approach undermines the requirement to adopt regulations that achieve technologically feasible GHG reductions from sources and categories of sources because it allows large unregulated oil refining emissions.¹⁶ The proposed Cap and Trade oil regulation definition states:

“Petroleum refinery” or “refinery” means any facility engaged in producing gasoline, gasoline blending stocks, naphtha, kerosene, distillate fuel oils, residual fuel oils, lubricants, or asphalt (bitumen) through distillation of petroleum or through re-distillation, cracking, or reforming of unfinished petroleum

¹⁶ H&S Code § 38560.

*derivatives. Facilities that distill only pipeline transmix (off-spec material created when different specification products mix during pipeline transportation) are not petroleum refineries, regardless of the products produced.*¹⁷

Recommendation: **The last sentence in the regulation definition should be struck**, as this definitional difference has no relation in determining whether such facilities emit large amounts of GHGs, criteria pollutants, or toxics. CARB should use standard industrial classification codes for oil refineries used by EPA and remove baseless exemptions, to prevent large unregulated oil refining emissions.

CARB provided no evaluation of the environmental impacts caused by exempting these sources. This definition is another means by which the oil industry has received special unnecessary exemptions from regulation under the Scoping Plan and its implementation. Many individual oil refining companies own geographically separated facilities that nevertheless are operated together as an integrated refining operation whether or not one portion treats intermediate materials. Regional smog regulators routinely treat these facilities as one facility, and would never consider exempting them from regulatory standards, such as Clean Air Act requirements, based on whether they process “transmix” materials, rather than based on their actual air emissions and impact on the environment. For greenhouse gas purposes, there is similarly no justification for treating some refinery facilities as exempt without at least providing an emission threshold above which they are subject to regulation. Other entities must abide by simple emission thresholds (>25,000 metric tonnes), so this exemption also represents an unfair business practice, with oil refineries getting a sweetheart deal.

B. Oil industry reductions are small or non-existent

The industrial sector has zero tonnes of specific reduction requirements, as provided by CARB in the chart below, including for the largest sources, the oil industry. This most polluting industrial sector has been successful in winning the complete abandonment in control requirements, a fact which is nothing less than shameful for our State. AB32 requires ARB to consider the significance of the contribution of each source or category of sources (in adopting a regulation).¹⁸ There is no way this can be argued as

¹⁷ Regulation Definitions, page A-28, <http://www.arb.ca.gov/regact/2010/capandtrade10/capv1appa.pdf>

¹⁸ H&S Code §38562(b)(9).

meeting AB32’s requirement to maximize reductions, and to reduce co-pollutants.¹⁹
 CBE urges CARB to correct this egregious error.

Greenhouse gas Reductions from Ongoing, Adopted and Foreseeable Scoping Plan Measures²⁰

Million tonnes of CO2 equivalent

Total of All Measures	62.0
Measures in Capped Sectors	49.0
<i>Transportation</i>	24.4
T-1 Advanced Clean Cars	3.8
T-2 Low Carbon Fuel Standard	15.0
T-3 Regional Targets (SB375)	3.0
T-4 Tire Pressure Program	0.6
T-5 Ship Electrification	0.2
T-7 Heavy Duty Aerodynamics	0.9
T-8 Medium/Heavy Hybridization	0.0
T-9 High Speed Rail	1.0
<i>Electricity and Natural Gas</i>	24.6
E-1 Energy Efficiency and Conservation	7.8
CR-1 Energy Efficiency and Conservation	4.1
CR-2 Solar Hot Water (AB 1470)	0.1
E-3 Renewable Electricity Standard (20%-33%)	11.4
E-4 Million Solar Roofs	1.1
<i>Industry</i>	0.0
I-1 Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	0.0
Measures in Uncapped Sources/Sectors	12.9
H-1 Motor Vehicle A/C Refrigerant Emissions	0.2
H-2 SF6 Limits on non-utility and non-semiconductor applications	-
H-3 Reduce Perfluorocarbons in Semiconductor Manufacturing	0.2
H-4 Limit High GWP use in Consumer Products	0.2
H-6 Refrigerant Tracking/Reporting/Repair Deposit Program	5.8
H-6 SF6 Leak Reduction and Recycling in Electrical Applications	0.1
F-1 Sustainable Forests	5.0
RW-1 Landfill Methane Control Measure	1.5

Last Updated: 10/28/2010

According to CARB’s regulation notice document, the entire Cap and Trade regulation will get 18 to 27 MMTCO₂e reduction by 2020, but none of these reductions are required to be achieved by oil refineries.²¹ The regulation and staff report documents make it clear that no entity is required to reduce emissions at their site.

¹⁹ H&S Code §§ 38560, 38562(b)(6), 38570(b)(2).

²⁰ CARB, reproduced above and available at:

http://www.arb.ca.gov/cc/inventory/data/tables/reductions_from_scoping_plan_measures_2010-10-28.pdf

²¹“ Staff estimates that implementation of the proposed regulation would reduce GHG emissions by 18 to 27 MMTCO₂e in 2020.” *Notice of Public Hearing to Consider the Adoption of a Proposed California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms Regulation, including Compliance Offset Protocols*, <http://www.arb.ca.gov/regact/2010/capandtrade10/capnotice.pdf>

A highly preferable alternative proposal would have been a thorough evaluation of Reasonably Available Control Measures necessary to meet CARB's requirements under AB32 for maximum reductions, to reduce smog in non-attainment zones, and toxics in overburdened heavily industrial areas. The following sections identify specific sources that should have been considered. For example, additional reductions could be achieved from:

- Requiring In-State reductions from industrial **boilers and heaters**, which CARB has already identified
- Removing **industrial exemptions for methane** from smog regulations,
- Requiring implementation of specific refinery by refinery measures identified in the **industrial energy efficiency audits**
- Limiting emissions and conversion to processing **Heavier Crude** at oil refineries (which is not cancelled out by adding polluting ethanol to gasoline)
- Requiring oil refineries to **switch fossil fuel electricity** use to clean alternative energy sources (since oil refineries use significant electricity)

More detail is provided below. CARB also found during the Scoping Plan process that many of these refinery control measures are feasible, but never required that these be carried out.

C. Boiler and Heater NOx and CO Co-pollutant emissions are large and if directly controlled would yield large local health benefits

AB32 requires ARB to design the program to *prevent* any increase in emissions of toxic air contaminants or criteria pollutants.²² It also requires it to consider the overall societal benefits of reducing other air pollutants and benefits to the environment and public health.²³ Yet the draft regulation demonstrates that reductions could have been achieved to substantially reduce co-pollutant emissions but was rejected.

CARB provided two spreadsheets calculating available measures for reducing CO2 emissions from industrial boilers and heaters, which are major pollution sources.²⁴ Measures include replacing old boilers of low or medium

²² H&S Code § 38570(b)(2).

²³ H&S Code § 38562(b)(6).

²⁴ Compliance Pathways Analysis – Boilers, available at <http://www.arb.ca.gov/cc/capandtrade/capandtrade/compathboiler.xls> and Compliance Pathways Analysis -

efficiency, optimizing combustion, improving insulation maintenance, etc. (listed below and in the attached spreadsheets). CARB identified how much energy would be saved for each of these measures in MMBTU (million British Thermal Units). CARB provided these reduction opportunity calculations not because these are being directly mandated, but to show possible ways that industrial sources *could* reduce, but are nevertheless allowed to buy their way out of under Cap and Trade. There was no showing that these reductions would not have been cost-effective. Regardless, the CARB list underscores the availability of measures for direct control. If these controls were implemented locally instead of traded, they would not only result in the CO2 emissions reductions identified by CARB, but would also result in very substantial co-pollutant reductions. **CARB should have considered such an alternative project to address co-pollutant impacts.**

It is a simple matter to calculate the co-pollutants associated with the energy savings identified in the boiler and heater spreadsheets. For example, standard AP42 emission factors for NOx and CO are available, based on natural gas combustion.²⁵ This will generally underestimate emissions because more polluting fuels are often used by these boilers and heaters, but applying the natural gas factors provides a conservative estimation, and still comes out to large emissions. The result, in tons per day, is provided below. The detailed tables are attached as an appendix. The full spreadsheets are separately attached.

Process Heaters, available at <http://www.arb.ca.gov/cc/capandtrade/capandtrade/compathprocessheat.xls>, also attached with CBE calculation sheet added to original CARB spreadsheet, Attachment CBE 4 – CBE calcs added to CARB Boiler data, and Attachment CBE 5 – CBE calcs added to CARB Heater data

²⁵ AP42 Chapter 1.4 provides the emission factors in units of lbs/scf (standard cubic feet of natural gas). Calculating as if all the units used natural gas, which is about 1020 btu/scf, we can convert the emissions factors to lbs NOx and CO per MMBTU. Since CARB provides the MMBTU, our spreadsheet provides the results in lbs NOx and CO. CARB's data was for 2008 annual emissions. Converting lbs/year to tons per day (a standard form used to evaluate the significance of criteria pollutants or smog precursors) yields the data provided in the chart below. CBE's spreadsheet, which includes the CARB spreadsheets plus CBE's NOx and CO calculations, is attached., Attachment CBE 6 – AP42 Chapter 1.4

The results are:

Boiler NOx reductions of 16.44 tpd + **Heater NOx** reductions of 7.35 tpd
 = **about 24 tons per day NOx**

Boiler CO reductions of 5.7 tpd + **Heater CO** reductions of 2.47 tpd
 = **about 8 tons per day CO**

For comparison, the following South Coast Air Quality Management District's ("SCAQMD") 2007 Clean Air Plan chart²⁶ shows total NOx for all the region's oil refineries averaged at about 13 tpd and total refinery CO emissions averaged at about 20 tpd:

Total Criteria Emissions South Coast Oil Refinery Emissions Data

(tons per day)	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	Average of 2001-2002 & 2002-2003 time periods
ROG	8.0	7.7	7.3	8.2	7.9	7.7
NOx	20.1	15.5	13.4	12.8	12.3	13.1
SOx	21.3	19.9	17.2	15.8	14.0	16.5
CO	18.4	14.6	18.2	22.0	21.8	20.1
PM	4.0	4.0	4.0	3.6	3.7	3.8

This demonstrates that NOx and CO reductions achievable statewide from directly controlling industrial boilers and heaters is large, using the methods identified by CARB. Reductions are on a par with the entire NOx and CO refinery emissions in the Los Angeles region. This region is the biggest refining area in the state. The Cap and Trade program on the other hand, allows refineries to buy their way out of achieving these reductions through credits obtained from other states or countries. Since most of these refinery sources are located in heavily industrial area, in communities of color, these sources create cumulative impacts in these areas, and allowing refineries to do buy pollution credits instead of directly controlling these sources, is inconsistent with environmental justice.

D. Methane is exempted from smog regulations, statewide

²⁶ *Refinery Trends – Criteria Pollutants*, 8/18/05, http://www.aqmd.gov/prdas/refinery/pdf/emission_trend.pdf, attached, Attachment CBE 7 – SCAQMD Refinery Criteria Pollutants

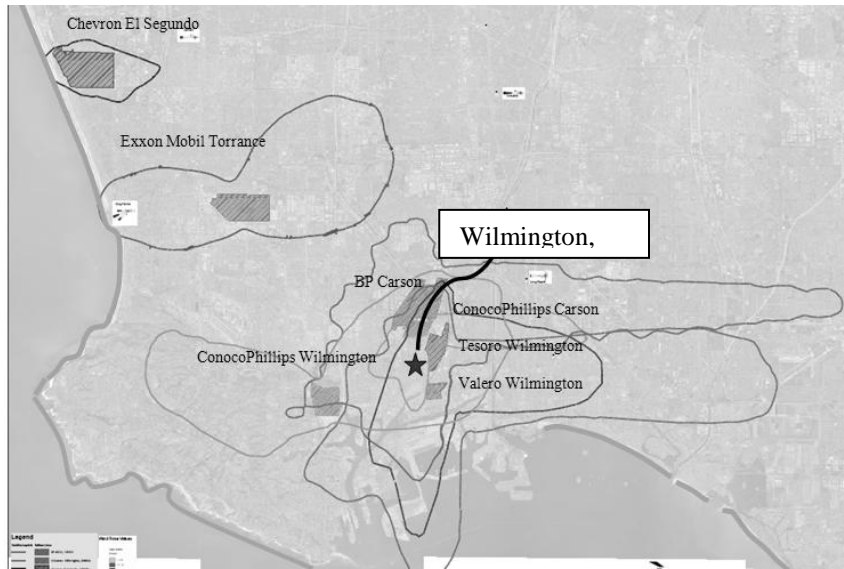
Comments submitted to CARB by CBE in May of 2008 on the Scoping Plan identified, based on CARB data, methane emissions that are exempt from regulation. For example, three categories of Stationary Sources listed (Fuel Combustion, Petroleum Production and Marketing, and Industrial Processes) emitted about 466 tons per day (about 170,000 tons methane per year) of exempt compounds, which is likely to be mostly methane. This is about 4 million tons CO₂e per year. There is no reason to continue exempting these emissions, either for smog, or for GHG impacts. Please see the attached comments, page 10.²⁷ It is now known that methane is a considerable contributor to smog, as also discussed in this earlier comment. AB32 requires the maximum technologically feasible GHG reductions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride; carbon is only one GHG.²⁸ Furthermore, CARB should remove entirely the methane exemptions for all sources in the state, including transportation sources. CBE proposed this, and CARB found it to be a feasible reduction measure, but never implemented it. Now CARB should evaluate adding this measure as a complementary reduction, as an alternative to the current Cap and Trade proposal, in order to achieve the maximum technologically feasible reductions.

E, Needed Co-Pollutant reductions do not address Environmental Justice issues

Any area with one refinery in it is impacted by a major pollution source. One example of extreme Environmental Injustice impacts due to the oil industry, with the very highest concentration of oil refineries in the state, is the Wilmington/Carson area in Southern California which contains about a third the state's refining capacity. This area includes about half of Los Angeles' refining capacity (five refineries and about 650,000 bpd). In the Los Angeles region overall, refineries dominate the top 15 VOC (Volatile Organic Compound) emitters, out of many hundreds of Stationary Sources listed by SCAQMD in the 2007 Air Quality Management Plan. The Wilmington Area includes about half the refinery VOCs emissions¹ (about 1,600 out of 3,200 tons per year) in the LA region. A plume map provided by SCAQMD graphically displays that Wilmington receives the air pollution from five overlapping refining plumes (isopleths) generated over this area (two ConocoPhillips refineries, Valero, BP, and Tesoro):

²⁷ Ibid, Attachment C -- Comments on CARB AB32 Scoping Plan, Oil Refineries, by CBE (part of a 3-part comment by EJ groups, this portion provided by CBE, attached), May 2008

²⁸ H&S Code §§ 38505(g), 38560.



Wilmington has the following demographics,²⁹ which demonstrate that people of color and low income people are bearing the brunt of the heavy industry concentration in this area.

	Wilmington	LA
Hispanic or Latino of any race	85%	45%
Median household income	\$30,260	\$42,190
Individuals below the poverty level	27%	18%

As if this extreme concentration of oil refineries was not enough to warrant local cleanup efforts, this area also includes oil drilling operations (Wilmington is the third largest oil field in the U.S.), extreme heavy diesel truck traffic (as a major goods movement corridor), the biggest Ports in the Country (Ports of LA and Long Beach which are the biggest single pollution sources in the area), and hundreds of other industrial sources. Clearly, refining areas are in need of direct, local pollution controls, not the potential for further concentration and expansions that the Cap and Trade proposal makes likely, through allowing refineries to buy their way out of local pollution control.

²⁹ U.S. Census Bureau, Zip Code Tabulation Area 90744, Census 2000 Demographic Profile Hlghlights

II. The Cap and Trade regulation can cause Co-Pollutant hotspots, especially due to foregoing reductions of more toxic emitters for more benign ones

Pollution hotspots are areas where pollution concentrates locally rather than dispersing. (Greg Karras, *Flaring hot spots: Assessment of episodic local air pollution associated with oil refinery flaring using sulfur as a tracer* CBE Report (July 2005). Hotspots can have dire health and other quality of life consequences. For instance, modeling has shown that RECLAIM actually increased NO_x concentrations in Wilmington, a low income community of color in Los Angeles, beyond what would have resulted without RECLAIM. (See Raul P. Lejano et al, *Testing the assumptions behind emissions trading in non-market goods: the RECLAIM program in Southern California*, ENV'T SCIENCE & POLICY 8 (2005) pp. 371, 374)

Hotspots are an issue in the carbon trading context because carbon dioxide is almost always released with other pollutants, or “co-pollutants. These co-pollutants can include particulate matter including heavy metals, VOCs such as benzene, sulfur compounds, and hundreds of other toxic compounds. If a facility located in an overburdened community “buys” carbon from other facilities so that it can increase its GHG emissions, it is also increasing its emissions of toxic compounds. Said another way, by taking pollution that occurs across a large area and concentrating that pollution in an environmental justice community, the toxic load in that community increases.

In addition, by mixing many different sources together into one big Cap and Trade program, the differences in co-pollutants emitted by different facilities and equipment is lost, and left unaddressed. Consequently an oil refinery CO₂ source that happens to have high benzene or high mercury, or high PM_{2.5} co-pollutants emissions, is treated the same as a food industry source CO₂ that burns natural gas, but has low co-pollutant emissions. This allows an oil refinery source to avoid regulation, or even expand, by buying it's way out through clean up of a facility with less toxic co-pollutants. If the oil refinery uses forest credit offsets, it definitely means that a more toxic source (an oil refinery) is offset by a less toxic source.

The proposed regulation does nothing to avoid hotspots or co-pollutant emissions. Yet AB32 requires that,

“Prior to the inclusion of any market-based compliance mechanism in the regulations . . . the state board shall . . . (1) Consider the potential for direct, indirect, and cumulative emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution; (2) Design any market-based compliance

mechanism to prevent any increase in the emissions of toxic air contaminants or criteria air pollutants.”³⁰

This failure must be corrected. In fact, ARB failed to take the first step necessary to do the analysis to determine cumulative impacts.

Framework for the Co-Pollutant Emissions Scenarios is flawed

CARB did not properly assess the co-pollutant risk. Co-Pollutant Emissions Assessment is limiting in that it only identifies four “impacted communities” for the purposes of demonstrating the hypothetical bounding exercise and has a problematic boundaries for the communities. ARB should reduce the scale of this assessment to magnify the local communities that are experiencing high exposures to pollution. It is unclear why CARB chose to exclude the West Oakland community and the Port of Oakland and yet, include predominately white, upper class and upper middle class cities such as Piedmont, Orinda and Regional Parks areas in East Contra Costa County. If the intent was to give a regional assessment, CARB should have included the East Bay communities where local PM 2.5 daily concentrations are exceeding federal standards. Low-income communities of color such as in East Oakland are overburdened by exposure to fine particulates and other pollutants and are vulnerable to cumulative impacts³¹.

ARB should adopt and utilize the Environmental Justice Screening Method (EJSM) to identify and monitor communities highly impacted by the cumulative emissions.³² The report states that this is not available on a statewide level, but the academic researcher team stated otherwise to the Environmental Justice Advisory Committee (EJAC) at their June 9, 2010 meeting. The EJAC strongly recommended that CARB utilize the tool to screen for impacted communities throughout the state to meet the requirements and the intent of AB 32³³. The EJSM may also be used to screen for other categories of impacted communities, whether they are highly impacted or not in order to ensure pollution reductions in communities highly impacted and that no new hot spots are being created, especially in a “medium” impacted community. ARB includes three scenarios for Community Case Studies (Appendix P-50). We find Scenario 1 – where all covered facilities reduce within the community and use offsets within the community – highly unlikely in the regulation’s proposed form in Richmond and Wilmington, due to expected trends in increasing refinery capacities and the unlimited geographic boundaries of the offset program. There are no requirements or

³⁰ § 38570(b)(1),(2). (Emphasis added)

³¹ Communities for a Better Environment, Lee. East Oakland Particulate Matter 2.5 Community-based Air Monitoring Research Report. 2010. Available at: <http://www.cbecal.org/campaigns/oakland.html>

³² See final EJAC comment letter. August 25, 2010.

³³ The final EJAC comment letter on the ‘Proposed Screening for Low-Income Communities Highly Impacted by Air Pollution for AB 32 Assessments’ dated August 25, 2010 is available for download at: <http://www.arb.ca.gov/cc/ejac/ejac.htm>

incentives to do this; in fact the whole regulation is stated to be designed for trading across state and international lines. However, this scenario could be more likely if the regulation is amended to geographically restrict trading and offsets. Scenario 2 – where all covered facilities increase their emissions – seems very likely, especially for sources like refineries, which are attempting to expand and will have to purchase offsets or additional allowances. Scenario 3 – where a new combined heat and power unit at an existing refinery is built in the community – there is a major deficiency in the analysis because it does not account for the possibility that refineries will utilize this increased efficiency in one area of the refinery to allow increased capacity to refine heavier, dirtier crude, resulting in a net increased emissions and exacerbating localized impacts. For example, CARB and the Air Quality Management Districts are well aware that this is the standard approach used in air permitting, and routinely carried out during expansions. Furthermore, due to the flexibility of the proposed regulation, we find the equally apportioned 4% greenhouse gas reduction at every cap-and-trade industrial and electricity generation facility in the community region extremely unrealistic.

Restricted trading zones within already impacted communities

The cap and trade regulation as currently proposed allows significant flexibility and benefits to polluters, but it impermissibly creates environmental justice problems. For example, because the regulation allows off-site reductions, we lose the potential for localized benefits and ARB creates a hard-to-track system that defeats the purpose of public vigilance and accountability. In highly impacted communities, there should be restrictions to trading to ensure meeting the requirements to not exacerbate hot spots of pollutions. Refineries will purchase additional credits or offsets if the cost of reducing greenhouse gases on-site exceeds the costs for other sectors because they can buy credits for a much lower cost. Oil refineries are expanding to accommodate a switch to process heavy crude oil in and around the Richmond and Wilmington communities.³⁴ Refinery emissions from fuel combustion are predicted to increase two to three times and add 1.6 to 3.7 billion tons greenhouse gas emissions annually from a switch to heavy crude oil or tar sands.³⁵ If trading is restricted to within these communities, reducing local emissions of criteria and air toxics will benefit the health of these same communities that are already overburdened by pollution. Furthermore, including direct emission reduction measures will ensure real, placed-based reductions, reduce cumulative impacts, and ensure meeting the maximum feasible reductions requirement of AB 32.

II. Many inappropriate exemptions are provided in the proposed regulation

³⁴ See CBE's and the EJAC's comments on the Proposed AB 32 Scoping Plan.

³⁵ Ibid, Karras, G.

Despite the large emissions and low reductions for industrial pollution sources, the regulation goes even further to protect these sources from regulation by providing outright exemptions. For example:

§ 95852.2. Emissions without a Compliance Obligation.

Emissions from the following source categories as identified in sections 95100 through 95199 of the Mandatory Reporting Regulation count toward applicable reporting thresholds but **do not count toward a covered entity's compliance obligation set forth in this regulation.** These source categories include:

(f) Fugitive and process emissions from:

(4) At petroleum refineries: asphalt blowing operations, equipment leaks, storage tanks, and loading operations; or

(5) At the facility types listed in section 95101(e) of the Mandatory Reporting Regulation, Petroleum and Natural Gas Systems: leak detection and leaker emission factors, and stationary fugitive and "stationary vented" sources on offshore oil platforms.

Neither a justification for this exemption, nor an evaluation of impacts was provided, nor could we imagine any possible justification. These exemptions are entirely inconsistent with requirements for maximizing reductions and should be struck.

Another exemption is provided for the use of ethanol:

§ 95852.2. Emissions without a Compliance Obligation.

Emissions from the following source categories as identified in sections 95100 through 95199 of the Mandatory Reporting Regulation count toward applicable reporting thresholds but do not count toward a covered entity's compliance obligation set forth in this regulation. These source categories include:

(c) Fuel ethanol:

(1) Cellulosic biofuel produced from lignocellulosic or hemicellulosic material that has a proof of at least 150 without regard to denaturants;

(2) Corn starch; or

(3) Sugar cane.

Again, no justification can be provided for this exemption, since ethanol introduction has many environmental impacts in California, the rest of the U.S., and

internationally, since it greatly increases smog, water pollution, and causes displacement of better land uses. These impacts were documented in CBE's comments on the Scoping Plan, and we refer CARB to those comments, as well as comments made by SCAQMD regarding the problem of the inclusion of ethanol causing increased smog in the region. It is a bad idea to exacerbate this further by giving ethanol a free ride.

III. CARB's accounting systems, particularly the International Forest protection programs (REDD) are vulnerable to fraud, and causes indigenous people's evictions

Three major criticisms of cap and trade schemes are that either the offsets themselves or the trading practices used to account for them are often not verifiable and are fraudulent, and that they can lead to oppression for indigenous communities.³⁶ The scoping plan proposes to expand a California cap and trade system to other countries where others might benefit from offsets. Put differently, AB32 would allow more pollution in California, including co-pollutants that would concentrate in low-income communities of color, with the hope that other countries will allow clean development. This vision fails to consider that these trades are not verifiable, they are often not surplus, they exacerbate the equivalency problem, and they increase the likelihood of oppression. AB32 specifically requires that the regulations do not disproportionately impact low-income communities,³⁷ that ARB consider the overall societal benefits of any regulation,³⁸ and that regulations minimize leakage³⁹. These requirements have not been met.

The Indigenous Environmental Network (IEN) has documented severe impacts due to carbon credit trading involving forests, including fake forest protection projects that also cause harm to indigenous people. For example, a company which is responsible for large deforestation projects can clear cut old growth in Southeast Asia, then grow monocropped junk non-native junk trees on the same land, and be paid by fossil fuel polluters to do so. The land must be purchased by the forestry company in order to get paid for the credits. For these reasons, indigenous people are being evicted from lands after large companies purchase these lands. This is a lose-lose situation for the

³⁶ For example, the regulations define (#143) "permanent" offsets as offsets that are permanent *or* have a system in place to replace them when they expire. This multilayered system of verification, particularly in an international context, will be extremely hard to monitor.

³⁷ H&S Code § 38562(b)(2).

³⁸ H&S Code § 38562(b)(6).

³⁹ H&S Code § 38562(b)(8).

environment – no reductions in fossil fuel are carried out because the polluter buys credits from the forestry operator. No forests are protected, and human rights are violated. California’s Cap and Trade program, which is seeking to expand internationally its linkage to other trading programs, is vulnerable to such bad offsets. IEN has published a popular education piece that graphically explains these problems. The publication includes detailed citations documenting examples of such occurrences. We urge CARB to evaluate this information, attached.⁴⁰

IV. The Proposed Regulation Fails to Fulfill the Mandate for Community Investment

Nowhere in the regulations or even in the staff report did ARB describe a strategy to implement the requirement to direct monetary benefits to disadvantaged communities. Yet AB32 requires that,

The state board shall ensure that the greenhouse gas emission reduction rules, regulations, programs, mechanisms, and incentives under its jurisdiction, where applicable and to the extent feasible, direct public and private investment toward the most disadvantaged communities in California and provide an opportunity for small businesses, schools, affordable housing associations, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions.⁴¹

In its discussion of the incomplete Health Impact Assessment, ARB notes that it will explore potential uses of revenue generated by the program to improve public health in California.⁴² It also notes that distribution of revenues is an issue that deserves further discussion.⁴³ While the draft regulation does *recommend* a Community Benefit Fund, as noted in , none of these recommendations commits ARB to any concrete action that would actually move private and public money into disadvantaged communities. Moreover, the section lacks a clear vision on the mechanism for giving a value to the

⁴⁰ IEN (Indigenous Environmental Network) Popular Education Piece: *We Want Your Land for Our Climate Fraud!* at <http://www.ienearth.org/REDD/redd.pdf> ; Top10 - What’s Wrong with REDD: <http://www.redd-monitor.org/2010/12/03/the-top-10-whats-wrong-with-redd/> ; Forest Destroying Oji Paper company and REDD: <http://www.redd-monitor.org/2010/11/29/forest-destroyer-oji-paper-to-carry-out-redd-feasibility-study-in-laos/#more-6560>, Attachment CBE 8 – IEN We Want Your Land for Our Climate Fraud, Attachment CBE 9 – IEN Whats wrong with REDD, and Attachment CBE 10 – IEN Forest Destroying Paper Company

⁴¹ H&S Code § 38565.

⁴² Staff Report, page VII-2.

⁴³ *Id.*, VII-4.

carbon credits, determining the allocation to the CBF and the best way to direct investments to the communities most impacted by air pollution.

Community Benefits Fund

Communities for a Better Environment was a co-sponsor of AB 1405, De León, California Global Warming Solutions Act of 2006: California Climate Change Community Benefits Fund, which was vetoed by Governor Schwarzenegger recently. This bill would have ensured that the most impacted and disadvantaged communities would get their fair share of revenues and mitigations from the implementation of AB 32. In this piece of legislation, there were three essential components – the creation of the fund, a percentage of revenues generated to fund direct health and environmental mitigations, and a clear definition of the communities to benefit from the fund⁴⁴. Though it did not pass, the inception and development of the bill provides a framework that the staff at CARB could use with amendments.

The amount going to these communities should be significant enough to fund sizeable projects that will have significant environmental benefits to local communities, especially communities living “fenceline” to pollution. Low-income communities tend to pay a higher proportion of their income on water, energy, and food than higher income people and this is expected to increase with the effects of climate change⁴⁵. We recommend allocating no less than 30% of the total revenues generated from the annual purchase of allowances and offsets that will be allocated to CBF. The revenues should directly benefit local communities most impacted by climate change in California to mitigate the costs of reducing carbon, which disproportionately falls on low-income communities⁴⁶. These communities need funds for planning, adaptation, mitigation, local solutions to reducing greenhouse gases and protecting their health now.

CARB should evaluate communities based on exposure to pollution as well as socioeconomic vulnerability that exacerbate the impacts of pollution. The academic research team of Rachel Morello-Frosch, Manuel Pastor, and Jim Sadd has been working on the EJSM as a product from contract work with the Air Resources Board and we believe this is the closest to the optimal statewide screening methodology for determining communities at the census tract level most impacted by pollution or cumulative impacts.⁴⁷ These indicators include: criteria and toxic air pollutant levels, proximity to

⁴⁴ AB 1405 information is available at: http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=ab_1405&sess=PREV&house=B&author=de_leon

⁴⁵ Shonkoff SB, Morello-Frosch R, Pastor M, Sadd J. 2009. Environmental Health and Equity Impacts from Climate Change and Mitigation Policies in California: A Review of the Literature. Publication # CEC-500-2009-038-D. Available at: <http://www.climatechange.ca.gov/publications/cat/index.html>

⁴⁶ Shonkoff, *et al.* 2009.

⁴⁷ Environmental Justice Screening Methodology. Rachel Morello-Frosch, Jim Sadd, Manuel Pastor. June 9, 2010 Environmental Justice Advisory Committee Meeting. Presentation available for download at: <http://www.arb.ca.gov/cc/ejac/meetings/060910/presentation.pdf>

hazards, sensitive land use, poverty level, educational attainment, percent home ownership, housing value, sensitive populations (less than 5 years and older than 60 years old), birth outcomes, linguistic isolation, and voter turnout. AB 1405 included unemployment level, while the EJSM does not. We recommend that ARB use the EJSM in the development of the CBF to adequately screen for eligible communities, but also include the communities that may not be included in the screening due to non-incorporated status. The EJSM should also be updated on a frequent and regular basis to accommodate new and developing research and statewide databases.

CARB must develop specific criteria for how the CBF should be used in order to meet AB 32 requirements to ensure low-income communities are not disproportionately impacted and that there are other benefits beyond greenhouse gas reductions⁴⁸. To address the need for stimulating the clean green tech industries, creating job training opportunities for low-income communities, job creation for low-income communities and to address possible disasters such as Hurricane Katrina, CBE recommends including, but not limiting the CBF funding these types of projects:

- projects that reduce both GHGs and co-pollutants in highly impacted communities, including stationary and mobile source pollution;
- non-fossil fuel electricity generating projects in and by local communities;
- green jobs training for low-income residents;
- disaster planning and preparedness, such as flooding, wildfires and other extreme weather events;
- creating community and specific plans to mitigate land use conflicts;
- reducing heat-island effects with strategies such as tree shade planting and “cool pavements”;
- improving access to mass transit for low-income riders;
- improving training of industry workers and reducing exposure to pollutants;
- supporting local sustainable agriculture;
- water conservation programs including water catchment projects for homes, roadways and buildings, and greywater use;
- improving water quality in low-income communities;
- and improving or creating park space in low-income communities.

Health Analysis Is Needed

CARB needs to complete and include a health analysis before taking action on the proposed regulation. This assessment would include the existing localized health burdens, the impacts of free allowances, trading, out-of-state offsets, economic impacts

⁴⁸ AB 32 requires consideration of “overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.” Health & Safety Code §38562(b)

and directing investments into the most impacted communities. This analysis is crucial to evaluating the proposed regulation.

Thank you for your consideration of our comments.

Sincerely,

Bill Gallegos, Executive Director, EJAC Representative
Adrienne Bloch, Senior Attorney
Julia May, Senior Scientist
Anna Yun Lee, Staff Researcher/ Scientist, Alternate EJAC Representative
Sally Newman, Legal Fellow

Appendix:

CBE's calculation of NOx Co-Pollutant Reductions achieved if the Industrial Boilers GHG reduction measures CARB identified were achieved In-State⁴⁹ (tons per day)

	1. REPLACE BOILERS		2. OPTIMIZE BOILERS		3. FEEDWATER ECONOMIZ		TOTAL 1-3
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	1.26	0.83	0.56	0.23	0.25	0.10	3.23
Food	0.08	0.06	0.05	0.02	0.04	0.02	0.27
Wood Prods	0.09	0.06	0.04	0.02	0.03	0.01	0.26
Chemicals	0.19	0.12	0.08	0.03	0.04	0.02	0.48
Oil and Gas	1.14	0.53	0.36	0.15	0.28	0.11	2.57
Total	2.76	1.61	1.10	0.45	0.64	0.26	6.81
	4. AIR PREHEATER		5. BLOWDOWN PRCTC		6. BLOWDWN HEAT RECOV		TOTAL 4-6
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.06	0.03	0.07	0.14	0.13	0.05	0.48
Food	0.01	0.00	0.01	0.02	0.01	0.00	0.05
Wood Prods	0.01	0.00	0.01	0.02	0.01	0.00	0.04
Chemicals	0.01	0.00	0.01	0.02	0.02	0.01	0.07
Oil and Gas	0.05	0.02	0.07	0.13	0.08	0.03	0.38
Total	0.13	0.05	0.16	0.33	0.24	0.10	1.03
	7. OPT STEAM QUAL		8. OPT COND REC		9. MINIM. VENTD STEAM		TOTAL 7-9
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.05	0.02	0.07	0.03	0.09	0.03	0.28
Food	0.01	0.00	0.01	0.00	0.01	0.00	0.04
Wood Prods	0.01	0.00	0.01	0.00	0.01	0.00	0.03
Chemicals	0.01	0.00	0.01	0.00	0.01	0.01	0.04
Oil and Gas	0.06	0.02	0.04	0.02	0.08	0.03	0.26
Total	0.13	0.05	0.13	0.05	0.20	0.08	0.65
	10 INSUL. MAINT.		11 STEAM TRAP MAINT.		12 STEAM LEAK MAINT.		TOTAL 10-12
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	1.17	0.21	1.26	0.85	0.42	0.17	4.08
Food	0.10	0.02	0.11	0.08	0.04	0.02	0.36
Wood Prods	0.09	0.02	0.09	0.06	0.03	0.01	0.31
Chemicals	0.17	0.03	0.19	0.13	0.06	0.03	0.60
Oil and Gas	0.75	0.14	0.80	0.54	0.27	0.11	2.60
Total	2.28	0.41	2.45	1.66	0.82	0.33	7.95
GRAND TOTAL						Tons per day	16.44
Total from Petroleum, Chemicals, Oil & Gas is biggest portion						Tons per day	15.08

⁴⁹ Using AP42 NOx Emission Factors, based on data CARB provided for MMBTU energy saved for measures above

(Total shown excludes the small portion from Food & Wood Products)		
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CO Co-Pollutant Reductions for Industrial Boilers (tons per day)

	1. REPLACE BOILERS		2. OPTIMIZE BOILERS		3. FEEDWATER ECONOMIZ		TOTAL 1-3
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.38	0.37	0.17	0.10	0.08	0.05	1.14
Food	0.02	0.03	0.01	0.01	0.01	0.01	0.09
Wood Prods	0.03	0.03	0.01	0.01	0.01	0.01	0.09
Chemicals	0.06	0.05	0.03	0.02	0.01	0.01	0.17
Oil and Gas	0.34	0.23	0.11	0.06	0.08	0.05	0.88
Total	0.83	0.71	0.33	0.20	0.19	0.12	2.37
	4. AIR PREHEATER		5. BLOWDOWN PRCTC		6. BLOWDWN HEAT RECOV		TOTAL 4-6
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.02	0.01	0.02	0.06	0.04	0.02	0.18
Food	0.00	0.00	0.00	0.01	0.00	0.00	0.02
Wood Prods	0.00	0.00	0.00	0.01	0.00	0.00	0.02
Chemicals	0.00	0.00	0.00	0.01	0.01	0.00	0.03
Oil and Gas	0.01	0.01	0.02	0.06	0.02	0.01	0.14
Total	0.04	0.02	0.05	0.15	0.07	0.04	0.38
	7. OPT STEAM QUAL		8. OPT COND REC		9. MINIM. VENTD STEAM		TOTAL 7-9
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.01	0.01	0.02	0.01	0.03	0.02	0.10
Food	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Wood Prods	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Chemicals	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Oil and Gas	0.02	0.01	0.01	0.01	0.02	0.01	0.09
Total	0.04	0.02	0.04	0.02	0.06	0.04	0.22
	10 INSUL. MAINT.		11 STEAM TRAP MAINT.		12 STEAM LEAK MAINT.		TOTAL 10-12
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.35	0.09	0.38	0.38	0.13	0.08	1.40
Food	0.03	0.01	0.03	0.03	0.01	0.01	0.12
Wood Prods	0.03	0.01	0.03	0.03	0.01	0.01	0.11
Chemicals	0.05	0.01	0.06	0.06	0.02	0.01	0.21
Oil and Gas	0.22	0.06	0.24	0.24	0.08	0.05	0.89
Total	0.68	0.18	0.73	0.73	0.24	0.15	2.73
GRAND TOTAL						Tons per day	5.70
Total from Petroleum, Chemicals, Oil & Gas is biggest portion (Total shown excludes the small portion from Food & Wood Products)						Tons per day	5.23












NO_x Co-Pollutant Reductions for Industrial Heaters (tons per day)

	1. REPLACE HEATERS		2. OPTIMIZE HEATERS		3. RECOV. FLUE GAS HEAT		TOTAL 1-3
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	3.03	1.29	1.05	0.43	0.47	0.19	6.44
Food	0.06	0.02	0.02	0.01	0.02	0.01	0.13
Iron & Steel	0.03	0.01	0.01	0.00	0.01	0.00	0.06
Chemical	0.07	0.03	0.02	0.01	0.01	0.00	0.15
Total	3.19	1.35	1.10	0.45	0.50	0.20	6.79
	4. REPL BRICK		5. INSULATION MAINT.				TOTAL 4-5
	Cat. 1	Cat. 2	Cat. 1	Cat. 2			
Petroleum	0.06	0.03	0.07	0.14			0.30
Food	0.00	0.00	0.01	0.02			0.03
Iron & Steel	0.00	0.00	0.01	0.02			0.02
Chemical	0.00	0.00	0.01	0.02			0.03
Total	0.07	0.05	0.10	0.33			0.55
GRAND TOTAL						Tons per day	7.35
Total from Petroleum, Chemicals, Oil & Gas is biggest portion (Total shown excludes the small portion from Food & Wood Products)						Tons per day	7.10

CO Co-Pollutant Reductions for Industrial Heaters (tons per day)

	1. REPLACE HEATERS		2. OPTIMIZE HEATERS		3. RECOV. FLUE GAS HEAT		TOTAL 1-3
	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	
Petroleum	0.91	0.57	0.31	0.19	0.14	0.08	2.20
Food	0.02	0.01	0.01	0.00	0.00	0.00	0.05
Iron & Steel	0.01	0.01	0.00	0.00	0.00	0.00	0.02
Chemical	0.02	0.01	0.01	0.00	0.00	0.00	0.05
Total	-	-	-	-	-	-	-
	4. REPL BRICK		5. INSULATION MAINT.				TOTAL 4-5
	Cat. 1	Cat. 2	Cat. 1	Cat. 2			
Petroleum	0.02	0.01	0.02	0.06			0.12
Food	0.00	0.00	0.00	0.01			0.01
Iron & Steel	0.00	0.00	0.00	0.01			0.01
Chemical	0.00	0.00	0.00	0.01			0.01
Total	-	-	-	-			-
GRAND TOTAL						Tons per day	2.47
Total from Petroleum, Chemicals, Oil & Gas is biggest portion (Total shown excludes the small portion from Food & Wood Products)						Tons per day	2.38

List of Attachments to CBE Comment 12/15/2010 to CARB on Cap and Trade Regulation

-  Attachment CBE 1 - ConocoPhillips Rodeo H2 Plant GHGs
-  Attachment CBE 2 – Previous CBE Comments May 2008 REFINERIES
-  Attachment CBE 3 – GKarras Environ Sci Technol paper High GHGs D...
-  Attachment CBE 4 – CBE calcs added to CARB Boiler data
-  Attachment CBE 5 – CBE calcs added to CARB Heater data
-  Attachment CBE 6 – AP42 Chapter 1.4
-  Attachment CBE 7 – SCAQMD Refinery Criteria Pollutants
-  Attachment CBE 8 – IEN We Want Your Land for Our Climate Fraud
-  Attachment CBE 9 – IEN Whats wrong with REDD
-  Attachment CBE 10 – IEN Forest Destroying Paper Company
-  Attachment CBE 11 – CBE Wilmington_Refineries report

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ⁱ Attachment D, Draft 2007 AQMP Appendix III, Base and Future Year Emissions Inventories, 10/06,