June 12, 2015

Mary D. Nichols
Chairman
California Air Resources Board
1001 I Street, PO Box 2815
Sacramento, CA 95812

Re: Comments on ARB's Short-Lived Climate Pollutant Reduction Strategy

Dear Chairman Nichols:

For more than a decade the Environmental Investigation Agency (EIA) has been closely involved in international ozone and climate negotiations. In addition to supporting efforts to phase down hydrofluorocarbons (HFCs) under the Montreal Protocol, EIA has worked domestically in the U.S., EU and Canada to promulgate regulations focused on phasing-down HFCs and incentivizing transitions to climate-friendly technologies.

We very much appreciate the efforts the California Air Resources Board (CARB) has taken to address short-lived climate pollutants, and particularly HFCs. We welcome both the ambition and the scope with which you are approaching HFC management and phase down in your new Short-Lived Climate Pollutant Reduction Strategy. We appreciate the opportunity to comment here.

Global View and the Opportunity for California

As the international community heads towards a milestone climate change agreement this year in Paris, the Parties to the Montreal Protocol stand poised to begin negotiations on the most immediate, cost-effective and tangible global measure to address climate change mitigation – the phase-down of hydrofluorocarbons (HFCs). The effect of the 2013 Obama-Xi agreement on HFCs, which you highlight in your Concept Paper, has dramatically changed how Chinese negotiators and policy makers are now discussing a phase-down of HFCs. There is now acceptance of the need to phase-down HFCs at an international level and interest in developing domestic measures to avoid the use of HFCs where possible. In addition, in April 2015 after the execution of the Obama-Modi Agreement in late 2014, India filed a proposal to amend the Montreal Protocol in order to permit an HFC phase-down. All of these are very positive signs.

While this is happening at the international level, there are huge opportunities for both federal and state efforts in the United States to jumpstart an HFC phase-down. With international momentum building to phase down HFCs, potential regulatory actions taken by the CARB to accelerate an HFC phase-down in California would have positive impacts and stimulate the developing global market of climate-friendly technologies. In addition, such action would act to hasten California's transition to climate-friendly HFC-free technologies leading to significant reductions in the state's greenhouse gas emissions, while also positioning Californian industry to lead the transition to the next generation of refrigeration and air conditioning equipment.

Additional Measures Beyond EPA's Significant New Alternatives Policy Program

CARB should continue to move forward as quickly as possible with plans to implement its HFC-phase down and sector bans, which will allow California to deliver an emission reductions program providing more mitigation than will be achieved under the U.S. EPA's Significant New Alternatives Policy (SNAP) Program two new rulemakings. As outlined in more detail in EIA's public comments to the EPA's pending rulemaking to delist certain high-GWP HFCs[i], previous comments submitted directly to CARB, and in light of EPA's recently published rulemaking listing additional alternatives[ii], there are many HFCs for which low-GWP alternatives have been proven and are being commercialized, making a state-led phase-down and additional bans feasible in the near term.[iii]

EIA strongly recommends that CARB consider including bans on additional high-GWP HFCs in new equipment for various applications, which have not yet been included on the proposed change in listing status under the current proposed SNAP rulemaking to be finalized later this year. Sub-sectors and applications that should be considered for additional bans include:

- Light commercial refrigeration and stand-alone systems
- Supermarket refrigeration systems
- Household refrigerators and freezers
- Ice skating rinks
- Water coolers
- Household refrigerators and freezers
- Industrial process refrigeration and air conditioning systems
- Domestic self-contained air conditioners

CARB's actions to ban additional HFCs will support the leapfrogging of remaining high- and midrange-GWP HFCs still allowed under the EPA's SNAP Program. A comprehensive and effective set of restrictions on the sale of new high-GWP equipment will not only establish California as a leader in the area, but it will also lead to long term cost savings for manufacturers and end-users by avoiding a secondary transitions to lower-GWP equipment at a later stage.

For applications such as domestic and commercial air conditioning, further development of standards and building codes may be required in order to fully commercialize certain low-GWP alternatives. EIA recommends that CARB work

proactively with standards organizations and companies making low-GWP alternatives to lay the groundwork needed for further bans in these end-uses. This may include ensuring that sufficient resources are available for research and testing needed for acceptance of new equipment and systems.

EIA will be happy to provide additional detailed comments and recommendations on these suggested measures as CARB continues to develop the HFC phase-down plan.

Refrigeration and Air Conditioning (RAC) Systems

California is a major consumer and port of entry for imports of refrigeration and air conditioning equipment containing F-gases. According to trade data, imports of RAC equipment and appliances in 2013 through Californian ports from China alone represented just over 50% of all U.S. imports of these kinds of equipment, with a total estimated value of more than $2 billion.[iv]

Refrigerants used in existing installed RAC systems currently primarily consist of climate and ozone-damaging fluorocarbon refrigerants (chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), and HFCs). However, systems using climate and ozone-friendly natural refrigerants (CO_2, hydrocarbons, ammonia, water, and air) that are HFC-free, do not have significant impacts on the climate, and these technologies are increasingly available for most RAC end-uses.

HFC-free RAC systems are not only better for the climate and more energy efficient than HFC-based systems, but they also keep operation and maintenance costs to a minimum. Systems using natural refrigerants have been found to have lower operating costs due to less refrigerant leakage, which also leads to lower overall maintenance requirements and reduced energy consumption.[v] As mentioned above, CARB should work with standards bodies and others to rapidly facilitate broad entry of these alternatives onto the market.

EIA commends CARB on its initiative to reduce the use of HFCs in new RAC equipment by at least 80 percent by 2030, as this should have a significant climate impact, while also keeping industry costs down – a key interest highlighted in the SLCP Concept Note. This action should be coupled with time-limited phase-outs of all uses of CFCs and HCFCs all of which have been phased out or are supposed to be phased out in the near future, and only remain in use due to the use of recycled CFCs and HCFCs. The EU banned all use of these substances and there is no reason that CARB cannot do the same. The primary CFCs have GWPs of 6000 and 8000 times that of CO_2 and although the CFCs and HCFCs being used are primarily recycled, they still are leaking and being vented into the atmosphere. The argument that they should still be allowed to use recycled CFCs and HCFCs has been rejected by the EU and should be rejected by CARB as the operators of equipment using these chemicals have known for decades that these substances would be phased out and there is no justification for allowing the continued emission of these chemicals to slow the recovery of the ozone layer and to worsen climate change.

Improving Leak Detection and Control and Reducing Lifecycle HFC Emissions

EIA also supports CARB in the attention it places on leak detection and lifecycle issues. Significant benefits can be realized from enacting best refrigerant management practices. State-of-the-art leak detection and maintenance are essential to prevent HFC emissions, cut down annual costs of refrigerant[vi], and ensure the highest energy efficiency from refrigeration and air conditioning equipment.[vii] When a system is low on refrigerant, the motor has to work harder to pump the low amount of refrigerant throughout the system quickly enough to provide the necessary heat exchange and cooling, thus requiring more energy than if the equipment is properly charged.[viii] General leak rates in the supermarket industry average about 25 percent of the equipment's refrigerant charge per year, however, those industry leaders participating in the EPA's Green Chill program[ix] routinely achieve leak rates under ten percent.[x] Benefits of refrigerant management practices include: cutting annual refrigerant costs, increasing energy efficiency of existing systems and decreasing energy use, and drastically decreasing emissions of HCFCs and HFCs, as well as indirect emissions of CO_2 due to reduced energy use.[xi]

Refrigerants will eventually reach the end-of-life use requiring the system to be recharged with either new virgin or certified reclaimed gas. Additionally, RAC systems are prone to leaks during normal operations[xii] and need to be periodically recharged to ensure efficient and safe performance. Instead of recharging this equipment with newly produced virgin HFCs, GHG emissions can be prevented by recovering previously used HFC refrigerant and recharging the system with certified reclaimed gas.

To varying degrees, CFCs, HCFCs and HFCs are supposed to be reclaimed every year from end-of-life refrigeration and air conditioning equipment and during servicing. Since they have been or are being phased out of production, there is increasing demand for reclaimed HCFC refrigerant for servicing older equipment.[xiii]

In contrast to HCFCs, there is little demand for reclaimed HFC refrigerant because of the current over-abundance of virgin HFC gas. Currently, less than 10-15 percent of HFC refrigerants are recovered, reclaimed, and re-used.[xiv] Without a proper incentive for reclamation, the vast majority of used HFC refrigerants are ultimately released into the atmosphere through venting or leakage. The EPA's proposals to extend Section 608 of the Clean Air Act will aim to address leakage, recovery and reclamation, and disposal of HFCs.[xv] A mandate in California's regulations to use reclaimed refrigerants will enhance the recycling industry, increase the cost paid to reclaim spent HFCs, and incentivize companies to improve leak detection and maintenance so they are not emitting a valuable product into the atmosphere.

Use of reclaimed HFCs to service existing refrigeration and air conditioning equipment displaces new production of virgin refrigerant, thereby directly avoiding GHG emissions that would otherwise occur. For example, *Recycling HFC Refrigerants Delivers Immediate, Cost-Effective Climate Protection* by EOS Climate explains that, "[w]ith relatively small changes in practices and little if any additional cost, HFC refrigerants can be recovered, reclaimed and re-used, potentially avoiding emissions the equivalent of 18 billion tons of carbon dioxide (CO2) between now and 2040—a critical window to

address climate change."[xvi] CARB can play a critical role in aiding in the development of the market for reclaimed HFC refrigerants.

Moreover, reclaimed refrigerants are often cheaper than virgin refrigerant[xvii], therefore allowing companies an opportunity to cut costs. Further, increasing demand for reclaimed refrigerant will increase capabilities of the reclamation industry needed to ensure an eventual safe and effective phase-down of HFCs. This is consistent with the objectives of the EPA and industry to increase the rate of refrigerant recycling and improve refrigerant management practices.

Low-GWP technologies and Improved Energy Efficiency

We note that CARB is rightly looking to achieve multiple improvements, where possible, where it decides to take regulatory action. Transitioning from HFCs to the low-GWP alternatives now available is definitely a climate-friendly move, but it also has energy efficiency gains.

With new energy efficient HFC-free technologies entering the market, potential cost savings associated with investments in energy efficient, HFC-free cooling equipment are substantial. These savings can have significant positive impacts, paying for conversions to HFC-free equipment over time and allowing resources to be allocated elsewhere.

Not-in-kind[xviii] equipment and equipment using climate-friendly natural refrigerants[xix] have been found to be significantly more efficient in many end-uses.[xx] Energy efficient HFC-free equipment based on natural refrigerants and/or not-in-kind technologies are already commercially available in many sectors, with significant development and new technologies being proven on a rapid basis for the remaining sectors. With energy efficient, HFC-free refrigeration and air conditioning equipment available and progressively more so, there is a huge opportunity to mitigate HFC emissions while cutting energy costs.

Not only will the implementation of energy efficient, HFC-free cooling equipment lead to reductions in energy costs, but CARB's leadership on energy efficiency will raise public awareness about the broad environmental and economic benefits of these products, leading to wider market adoption and significant greenhouse gas reductions.

Mitigation Fee

We support the idea of assessing a mitigation fee, and believe that it should cover all HFCs on a CO_2 equivalent basis based upon the global warming potential (GWP) of each HFC. Precedent for similar fee structures in other countries, based on the GWP, include Denmark, Norway, and Poland. Typically such fees cover imports as well as production, with different types of pre-charged equipment being charged at a rate consistent with a pre-determined average quantity, or charge size. CARB may also consider various uses of revenues from such a fee including the possible incentive programs for low-GWP equipment and retrofits mentioned in the scoping plan update, as well as examples from other countries such as Norway, where revenues have been used to fund a rebate program for delivery of HFCs for destruction at end of life.

Conclusion

Again, EIA greatly appreciates the opportunity to comment at this time and we look forward to an ongoing dialogue as CARB moves toward finalizing its SLCP strategy over the next few months. With the ambitious climate goals set by Governor Brown, California has a real opportunity to carve out the path for significantly increased HFC reductions.

Sincerely,

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[i] EIA's comments available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2014-0198-0134

[ii] http://www.epa.gov/ozone/snap/download/SAN_5745-SNAP_Low_GWP_Refrigerants_FRM_Signature_Version-signed-2-27-2015.pdf

[iii] Please reference EIA's HFC-free Procurement report at: http://eia-global.org/images/uploads/EIA_HFC-free_Procurement_Report_FINAL_JUNE_10.pdf

[iv] Trade data from PIERS available at: https://www.piers.com/

[v] http://www.linde-gas.com/internet.global.lindegas.global/en/images/Natural%20refrigerants%20overview%20brochure17_108805.pdf.

[vi] http://arb.ca.gov/cc/rmp/best_management_practices_pamphlet.pdf.

[vii] Institute of Refrigeration UK. *Real Zero – Reducing refrigerant emissions & leakage – feedback from the IOR Project.* 2010. Web. 26 Aug 2014.

[viii] ACR Today. *Kevin Priest from A1-CBISS explores ins and outs of gas leak detection.* 19 May 2014. Web. 26 Aug 2014.

[ix] http://www2.epa.gov/greenchill.

[x] http://supermarketnews.com/store-design-amp-construction/greenchill-retailers-defy-refrigerant-leak-trends#ixzz26keDlLUd.

[xi] http://arb.ca.gov/cc/rmp/best_management_practices_pamphlet.pdf.

[xii] http://www.epa.gov/greenchill/downloads/RealZeroIllustratedGuideto13CommonLeaks.pdf.

[xiii] https://www.divpc.com/refrigerant-reclamation.

[xiv] http://eosclimate.com/wp-content/uploads/2015/04/EOS-Climate-White-Paper.pdf.

[xv] http://www.epa.gov/ozone/title6/downloads/Section_608_FactSheet2010.pdf.

[xvi] http://eosclimate.com/wp-content/uploads/2015/04/EOS-Climate-White-Paper.pdf.

[xvii] https://www.divpc.com/refrigerant-reclamation.

[xviii] Not-in-kind technology means any system that breaks with conventional technologies reliant on gaseous refrigerants used in the vapor compression cycle. There is a wide range of technologies, including: magnetocaloric refrigeration, adsorption cooling, district cooling, and evaporative cooling. Many more emerging technologies are being developed by companies in conjunction with the DOE's Building Technologies Office under its Emerging Technologies program.

[xix] Natural refrigerants are refrigerants with negligible climate impacts and minimal risks to human health and the environment. The five natural refrigerants are: Hydrocarbons such as propane and iso-butane, carbon dioxide, ammonia, water and air.

[xx] http://naturalrefrigerants.info/.