November 1, 2013

Ms. Mary Nichols, Chairman and Members of the

Air Resources Board

1001 “I” Street

Sacramento, CA 95814

Re: The Environmental Investigation Agency’s Comments to Air Resources Board on Discussion Draft for 2013 Update to AB 32 Scoping Plan

Dear Chairman Nichols and Members of the Air Resources Board:

The Environmental Investigation Agency (“EIA”) is pleased to submit these comments on the Discussion Draft for 2013 Update to AB 32 Scoping Plan. As noted in the Discussion Draft, HFCs (hydrofluorocarbons) are high global warming potential (GWP) gases, with global warming levels hundreds to thousands of times greater than carbon dioxide (CO2). EIA agrees that “although only three percent of today’s statewide inventory, the emissions of high-GWP gases are expected to increase in California due to the replacement of ozone-depleting substances (ODS) with HFCs, in response to the Montreal Protocol mandates. Significant effort will be needed to control these emissions as the ODS are phased out.” Thus, concrete actions must start now to begin eliminating HFCs.

The Environmental Investigation Agency

The Environmental Investigation Agency (EIA) is an independent campaigning organization committed to bringing about change that protects the natural world from environmental crime and abuse. As part of our work, we have undertaken groundbreaking investigations into the illegal trade in ozone depleting substances (ODS) and have been closely involved in the international ozone and climate negotiations for well over a decade. We are also a member of the Climate and Clean Air Coalition (CCAC).

EIA’s climate campaign is primarily focused on HFCs (hydrofluorocarbons), third generation gases produced by chemical producers in response to the phase-out of ozone-depleting CFCs and HCFCs. Used in refrigeration and air-conditioning, these super greenhouse gases (so-called because their Global Warming Potentials are often thousands of times higher than CO2) are the fastest growing source of greenhouse gas emissions.

HFCs – Understanding the problem

Hydrofluorocarbons (HFCs) are man-made fluorinated gases (F-gases) developed and commercialized to replace CFCs, HCFCs and other chemicals that de­plete the ozone layer. Unlike CFCs and HCFCs, HFCs do not harm the ozone layer; however, they are powerful greenhouse gases (GHGs), with global warming potentials (GWP) hundreds or thousands of times more powerful than CO2. HFCs are primarily used in refrigeration, air conditioning, foam blowing, aerosols, fire protection and solvents. Climate-friendly alternative refrigerants and technologies are available, and are being devel­oped, for almost every use of HFCs which means that HFCs can be phased-out over time.

In a little more than 20 years of commercial production, HFCs already represent 1% of global GHG emissions and 2% of U.S. emissions.[[1]](#endnote-1) Although their contribution to climate forcing is still relatively small, it is expected to soar in the coming decades, with emissions of high-GWP HFCs increasing at a rate of 10-15% per year.[[2]](#endnote-2) Un­less action is taken, global HFC emissions could reach 5.5–8.8 GtCO2e per year in 2050, equiva­lent to 9–19% of projected global CO2 emissions under a business-as-usual scenario. This increase could even be as high as 28–45% compared if climate mitigation actions were able to stabilize CO2 emissions at 450 ppm CO2. A largest share of the increase in HFC use will take place in developing countries, where emissions are projected to increase so that they are 800% greater than developed countries’ emissions by 2050.[[3]](#endnote-3)

By 2050, the accumulation of HFCs in the atmosphere is expected to increase radiative forcing by up to 0.4 W m2 relative to 2000. This increase could constitute as much as one-fifth to one-quarter of the expected increase in radiative forcing due to the build-up of CO2 since 2000, according to some scenarios. Preventing this increase would save at least an increase of 0.5 degree Celsius by 2050.

General Comments

EIA applauds California’s Air Resource Board (CARB) on its actions and focus on short-lived climate pollutants, specifically HFCs. We also are encouraged by CARB’s decision to build on its previous actions to control HFC emissions and developing a strategy that will include an inventory of emissions, an identification of research gaps, and a plan for further control measures. While these steps are critical, the time frame in which they are to be completed is longer than necessary for the actions needed to protect the climate. Significant steps to reduce HFC emissions need to begin now, not in 2016. Additionally, direct regulation through a phase-down schedule, bans on use in the many sectors where alternatives are already proven such as commercial refrigeration, foams and aerosols, or fees for use, would be a more effective way to reduce emissions of HFCs than through a cap and trade system, due to HFCs extremely high global warming potentials, and the fact that they are used in a relatively small number of industrial sectors. If CARB were to follow the EU F-gas Regulation and impose a surcharge per CO2 for placing products with HFCs on the market, CARB could generate millions of dollars that it could use to promote alternative technologies, conservation and if necessary, price support for HFC equipment if it becomes too expensive. Finally, alternative technologies are available now for most end uses and more and more technologies coming on the market each year. For the commercial and industrial refrigeration and air conditioning sectors, proven, commercially available technologies are being used in California, and around the world right now.

Management for Commercial and Industrial Refrigeration

The proposed refrigerant management plan does not go far enough in dealing with HFC emissions from commercial and industrial refrigeration, and as demonstrated by the bans in the EU F-gas Regulation the time frame proposed is too slow. Currently, CARB has indicated that low-GWP refrigerants are under evaluation to potentially develop programs to require low-GWP system that use either no HFCs or significantly reduced amounts of HFCs. In the US alone, there are over 4,000 light commercial refrigeration units that use HFC-free refrigerants, over 100 supermarkets are using CO2 as a refrigerant, with additional stores also using glycol to significantly reduce the HFC charge (from approximately 4000 lbs to 250 lbs) needed in the system. In California alone, there are more than 400 industrial sized facilities using ammonia or ammonia cascade systems instead of HFCs.[[4]](#endnote-4)

In Europe, over 4,000 supermarkets are using CO2 transcritical or CO2/HFC cascade refrigeration systems, both virtually eliminating HFC emissions and delivering significant energy efficiency gains. Recently, Delhaize America opened a state-of-the-art, climate-friendly grocery store in Turner, Maine.  The Hannaford grocery store uses a CO2 transcritical system instead of HFCs.  The new system reduces the store’s carbon footprint by 3.4 million pounds of CO2equivalent every year, which is the same as taking 305 cars off the road.

In California, many stores are using HFC-free or reduced HFC charged systems. For example, Supervalu has installed an HFC-free refrigerant system at their Carpinteria Albertson’s store that uses two main systems, an ammonia primary system and a CO2 medium temperature cascade to a DX system on the low temperature side. Only 250 lbs of ammonia are needed in this system, and the ammonia is all located in an outdoor enclosure. The reduction in total equivalent warming impact of this system, which measures recovery losses, leakage, and energy consumption, is 84% compared to an HFC system. Also, a Target in San Clemente installed a refrigeration system that uses CO2 and glycol, significantly reducing their HFC charge and reducing the stores carbon impact by 65%.[[5]](#endnote-5) In Rosemead and Folsom, Fresh & Easy has installed cascade refrigeration systems that use a reduced HFC charge. The Rosemead store uses CO2 and HFCs and has 41% less carbon emissions. By using CO2, the Folsom store has reduced the amount of HFCs used to only 10% of a standard refrigerant charge size.[[6]](#endnote-6) These smaller charge size systems have tighter and smaller piping than traditional systems so have a commensurate reduction in the percentage of emissions.

In addition to pushing for transitions to HFC-free or significantly reduced HFC charged refrigeration systems, CARB should focus on leak detection, state-of –the –art maintenance, and the recovery, recycling, and reuse of HFCs. CARB has acknowledged that the biggest reductions of high-GWP gases are expected to come from the Refrigerant Management Program, yet it is indicated that this measure is not available at this time. Leakage rates can be cut to 6-8% from 25% by aggressive leak detection and state-of –the –art maintenance. Most emissions are from a few known valves and can be prevented by regular monitoring, repair and replacement. Recovery, recycling and reuse is a fundamental part of Montreal Protocol Compliance and there is no reason the same program and in most cases the same equipment could not be implemented for HFCs. As a result, the Refrigerant Management Program should be an integral piece of CARB’s program. The ban in the EU F-gas Regulation with the greatest support is the immediate ban of HFCs in all new commercial and industrial refrigeration equipment. The technology is available now; there is no reason for CARB to delay.

Restrict the Sales of HFCs to Anyone Other than Certified Technicians

The U.S. is the only developed country that has not banned the sale of air conditioner recharge kits to the general public, CARB should demonstrate to the U.S. Environmental Protection Agency (EPA) the importance of taking this action nationally. Under Section 609 of the Clean Air Act the EPA prohibited the sale of small cans (less than 20 pounds) of CFC-12 to anyone other than an EPA-certified technician. This CFC-12 sales restriction 1) reduced the risk of cross-contaminating refrigerants and lubricants in order to maintaining the cooling capacity, efficiency, and reliability of refrigeration and air conditioning equipment; 2) encouraged the recovery and recycle of refrigerants by avoiding the cost of cleaning up contaminated refrigerants; and 3) discouraged owners of refrigeration and air conditioning equipment from undertaking ill-advised do-it-yourself recharge of leaking systems and significantly reduced the use and emissions of CFCs and CFC substitutes. At the same time, a government-industry partnership, co-chaired by EPA, developed a standard of purity for recycled CFC-12 from motor vehicles and a recycle test standard to certify that recycling machines could clean a standardized worst-case contaminated test sample of refrigerant to the agreed standard of purity. The combination of the ban on small cans and the commercialization of certified CFC-12 recycling equipment eliminated the largest single source of intentional ODS GHG emissions while increasing U.S. manufacturing jobs and profits and also increasing service industry employment. At that time EPA choose not to restrict the sales of HFC-134a in small cans.

EPA data indicates that about half of the HFC-134a sold today for MAC service is used by do-it-yourself car owners to service about 10% of vehicles needing service and that about half is sold for professional service of the other 90% of vehicles needing service. ARB has performed testing on DIY kits, found that 25% of DIYers emit 60% of the refrigerant, and all kits release at least 33% during recharge.[[7]](#endnote-7) Despite the design changes to DIY HFC containers CARB mandated previously, the emissions from DIYers continue to be dramatically higher that air-conditioning recharges performed by licensed technicians.

Professional service providers are able to minimize HFC emissions because they have proper tools and information including refrigerant recovery equipment, sophisticated leak detectors, and service bulletins and recharge instructions for each type of vehicle, including among other things, the proper amount of HFC required for the recharge. Do-it-yourself vehicle owners (DIYers) rarely own or have access to any of these tools. Additionally, DIYers frequently merely recharge leaking systems without repair, often resulting in continuous emissions, more frequent recharges and substantially higher total emissions.

Allowing DIY recharges has the appearance of giving people savings compared to professional service, similar to allowing people to change their own oil. However, the DIY strategy if often more costly in the long run because failure to perform repairs results in higher refrigerant use and more frequent recharges; improperly charged systems consume more gasoline to achieve the required cooling; while under-charged systems and systems without adequate oil mixed with the refrigerant will wear out rapidly and require costly replacement of parts such as the compressor. Additionally, used vehicles with broken air conditioners are expensive to repair and have significantly lower resale value. Pennywise and pound-foolish. Furthermore, DIY service of high-pressure MAC systems has a risk of injury if systems are improperly disassembled, if refrigerant charging hoses are attached to the wrong fitting, or if hands are in the way of cooling fans that start unexpectedly in response to thermostatic controls.

The EPA ban on sales of small cans of CFC-12 would have been more successful as a ban on all sales in portable containers for recharging air conditioning, because similar environmental and consumer protection justification for the ban on CFC-12 apply to the sales of HFC-134a. Now that the global automobile industry will be transitioning from HFC-134a to HFC-1234yf or CO2 there is an even more compelling reason to ban the sales of HFC-134a for all but professional service – to avoid the recharge of MAC systems designed for HFC-1234yf with lower cost HFC-134a and the risk of injury if HFC-134a is put into a CO2 system. The risk of using a cheaper refrigerant did not exist during the transition from CFC-12 to HFC-134a because the phase-out of CFC-12 and the ban on small can sales kept the price of CFC-12 higher than the price of HFC-134a. The cost of HFO-1234yf is now approximately 10 times the cost of HFC-134a. Also, both HFOs and CO2 have systems that are pressurized and incompatible with HFC-134a and carry real risks of injury and damage to vehicles if there is improper an recharge with HFC-134a.

California’s plan for reducing HFC emissions should include an immediate ban on do-it-yourself HFC recharge kits.

HFC-free Foam Blowing Alternatives

It has been proven repeatedly in the HCFC Phase-out Management Plans submitted to the Montreal Protocol’s Multilateral Fund, that HFCs are no longer needed to be used in any foam blowing applications. Hydrocarbon expansion agents such as pentane, isopentane, cyclopentane, as well as water, CO2, methyl formate, methanyl and HFO-1234ez all exhibit dramatically lower GWP values than HFCs and can be used effectively and provide the same or better energy efficiency ratings for the foams in all foam blowing categories in place of HFCs. On EPA’s Significant New Alternatives Program’s (“SNAP”) website there are between 4 and 12 low-GWP alternatives for every class of foam blowing where HFCs has been found acceptable for use. Given this plethora of low-GWP alternatives, there can be no justification for any continued use of HFCs in foam blowing operations. CARB must develop programs now that will require a rapid conversion to HFC-free technologies be used in insulating foam materials and an immediate ban on the sale of any foam blowing equipment that uses HFCs.

Alternative Suppressants in Fire Protection Systems Exist Now

Fire suppression accounts for only approximately 1% of global HFC production. Commercially available, technically proven alternatives to ozone depleting substances (“ODS”) and HFCs for fire protection have been developed and include: halocarbon agents, e.g. a fluoroketone (FK); inert gases, e.g. nitrogen and argon and their blends; carbon dioxide; water mist technologies; inert gas generators; fine solid particles (powders); dry chemicals; aqueous film-forming foam; and water. As in other sectors, no one fire suppressant is suitable for all requirements, but there are non-ODS, HFC-free alternatives for all uses, which could reduce most if not all use of HFCs in fire suppression. CARB should begin to require transitions to non-HFC alternatives now, as it is a feasible next step.

Mitigation Fee on High-GWP Gases

Placing a mitigation fee on high-GWP gases, not only will help companies prioritize lower GWP alternatives, it will also help implement President Obama’s Climate Action Plan. In July of 2012, President Obama announced that “[m]oving forward, the Environmental Protection Agency will use its authority through the Significant New Alternatives Policy Program to encourage private sector investment in low-emissions technology by identifying and approving climate-friendly chemicals while prohibiting certain uses of the most harmful chemical alternatives.” In order to remain a leader in climate change mitigation, California should not only charge a fee on the highest GWP HFCs, but also should begin prohibiting their use beginning in 2014.

State of California Procurement Policies Should Mandate Acquisition of HFC-Free Technologies

The State of California has frequently led by example. The State owns and leases many buildings with air-conditioning, refrigeration, drink vending machines, and foam insulation; owns a huge fleet of vehicles; and acquires fire suppressants, aerosols and other products that contain HFCs. CARB should get the state procurement requirements to mandate the acquisition of lease of HFC-free buildings, equipment and products.

In closing, EIA is encouraged by CARB’s focus on short-lived climate pollutants, and looks forward to working more closely on the phase-down of HFCs in California. However, without adequate steps to address these super-greenhouse gases, much of CARB’s efforts to control other greenhouse gases will be off-set. Therefore, the EIA strongly encourages CARB to implement concrete measures to begin eliminating HFCs now. The alternatives are available, all that is required now is the political will and mandate to make this change happen.

If you have any questions or comments, please feel free to contact Mark Roberts at [markroberts@eia-global.org](mailto:markroberts@eia-global.org), (978) 298-5705 or Danielle Gagne at [dgagne@eia-global.org](mailto:dgagne@eia-global.org), (202) 483-6621.

Very truly yours,

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Attached: *HFC-Free Technologies Are Available in the US Market for the Supermarket-Retail Refrigeration Sector*

1. UNEP (2011), HFCs: A Critical Link in Protecting Climate and the Ozone Layer [↑](#endnote-ref-1)
2. Id. [↑](#endnote-ref-2)
3. *See* Guus J.M.Velders, et al., *The large contribution of projected HFC emissions to future climate forcing*, 106 PROC.NAT’L. ACAD. SCI. 10949, 10952 (2009) *available at* <http://www.pnas.org/content/early/2009/06/19/0902817106> [↑](#endnote-ref-3)
4. <http://www.rtknet.org/db/rmp/rmp.php?reptype=f&database=rmp&facility_name=&parent=&combined_name=&city=&county=&state=CA&zip=&district=&execsum=refrigeration&all_naics=&chemical_id=56&datype=T&sortp=F&detail=0> [↑](#endnote-ref-4)
5. <http://supermarketnews.com/store-design-amp-construction/retailers-see-tradeoffs-co2-refrigeration#ixzz2jP12gGai> [↑](#endnote-ref-5)
6. <http://supermarketnews.com/store-design-amp-construction/retailers-see-tradeoffs-co2-refrigeration?page=2> [↑](#endnote-ref-6)
7. <http://www.sae.org/events/aars/presentations/2008/albertoayala.pdf>; <http://www.arb.ca.gov/research/apr/past/06-341.pdf> [↑](#endnote-ref-7)