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Via Electronic Submission
California Air Resources Board
Attn: Rajinder Sahota, Assistant Division Chief
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https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=ct-6-21-18-wkshp-ws&comm_period=1

Re: Comments of A-Gas Americas − June 21, 2018 Workshop Staff Proposal: Potential Amendments to the Cap-and-Trade Regulation

Dear CARB:

A-Gas Americas appreciates this opportunity to provide comments on the California Air Resources Board staff proposals for potential amendments to the cap-and-trade regulations implementing Assembly Bill 398 (Garcia).[1] These comments are submitted following the public workshop held on June 21, 2018.

As a leading national recycling company, A-Gas commends the ongoing leadership of the State of California in addressing global warming, climate change and related environmental issues. We strongly support the efforts of CARB and its staff in the development of the cap-and-trade program and the policy choices that must be made to implement the adjustments to the cap-and-trade program under A.B. 398. We offer the following comments on the initial staff proposal, with a particular emphasis on reclamation and destruction of high-GWP refrigerants and other halocarbons in the context of the compliance offsets program.

I. Background

A. Halocarbon Destruction Benefits

As CARB is well aware, older generation halocarbons, such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons pose an ongoing threat to the stratospheric ozone layer and have been phased out under the international Montreal Protocol and federal Clean Air Act due to their adverse environmental impacts.[2] Halocarbons are chemically inert and non-

[1] These comments respond to the CARB Staff Workshop Presentation on June 21, 2018 and staff working document "Additional Regulatory Text in section 95854 'Direct Environmental Benefits in State'."

[2] As described by the California health department: "Stratospheric ozone (also known as the ozone layer) is located approximately 10 to 30 miles above the earth's surface. It forms a natural layer that protects life on earth from

toxic in normal use as refrigerants, fire suppressants, propellants, and foam-blowing agents.[3] But a fact of life is that these now ubiquitous "miracle" chemicals are ozone-depleting substances (ODS) and over time will leak from refrigeration and air conditioning equipment through compressor seals, valves and piping, tanks and other sources, particularly from older equipment. Because of the adverse effect of halocarbons on the ozone layer, the federal Clean Air Act has imposed a use and manufacturing phase-outs of early generation halocarbons since the early 1990s under which virgin CFCs and HCFCs are now banned.[4] However, millions of tons of halocarbon stocks still exist in equipment or stockpiles.

Halocarbons are also potent greenhouse gases (for example, the common refrigerant R-12 has a global warming potential (GWP) of 10,900). Venting and leaks of halocarbons from refrigeration equipment and other sources into the atmosphere contribute significantly to the global warming and climate change impacts that A.B. 32 was designed to abate. As illustrated by the graphic below,[5] the vast majority (78%) of halocarbon emissions can be traced to leaks from refrigeration equipment, making reclamation of older refrigerants a critical part of California's strategy to reduce these high-GWP short-lived climate pollutants.

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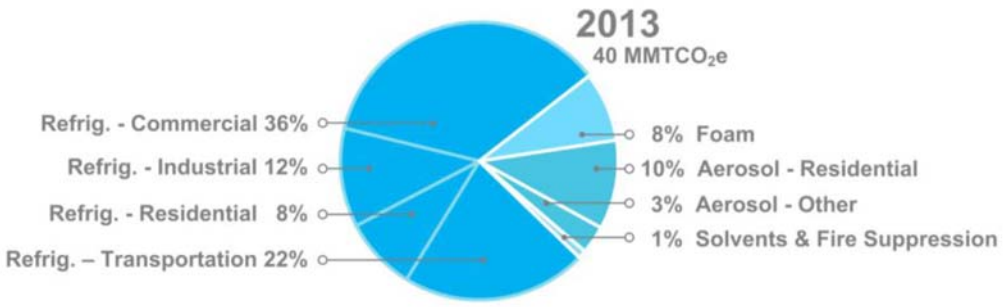
the sun's harmful ultraviolet (UV) rays. Over time, the release of man-made substances such as chlorofluorocarbons (CFCs), halons, methyl bromide and hydrochlorofluorocarbons (HCFCs) has contributed to the depletion of the ozone layer worldwide. Because of the potential for damage to the environment and to people from depletion of stratospheric ozone, the Montreal Protocol on Substances that Deplete the Ozone Layer was adopted internationally in 1987. Its intention was to phase out ODS production worldwide, with the goal of having the ozone layer recover by 2050. It has undergone six revisions since its inception. Both the Montreal Protocol and the Clean Air Act (CAA) govern ODS production in the United States; however, there remains a gap in the legislation which the Ozone Depleting Substances Offsets Protocol (ODS Protocol) aims to address. Under both the Montreal Protocol and the CAA, the destruction of existing stocks of ODS is not required. This means that ODS stock can be left to leak into the atmosphere or can be reused indefinitely. Reuse of ODS stock can be particularly problematic, as it is often placed in older equipment with high leakage rates. The ODS protocol aims to target this problem area by focusing on the destruction of two sources of ODS stock: refrigerants and foams." *See* Public Health Assessment of a Cap-and-Trade Framework, California Department of Public Health (Dec. 2010) at p.42 (internal citations removed), available at https://www.arb.ca.gov/cc/ab32publichealth/cdph_final_hia.pdf.

[3] Ozone depleting substances (ODS) are chemicals that, when released into the atmosphere, destroy stratospheric ozone, and are large contributors to global warming. ODS were traditionally used in applications such as refrigerants, foam blowing agents, solvents and fire suppressants. *See* Public Health Assessment of a Cap-and-Trade Framework, California Department of Public Health (Dec. 2010) at 41, available at https://www.arb.ca.gov/cc/ab32publichealth/cdph_final_hia.pdf.

[4] For a short history of refrigerants as miracle chemicals, see https://www.washingtonpost.com/archive/politics/1988/04/10/cfcs-rise-and-fall-of-chemical-miracle/9dc7f67b-8ba9-4e11-b247-a36337d5a87b/?utm_term=.e45284912995 (noting that "the very stability that prevents toxicity in CFCs assures that the chemicals will rise to the stratosphere").

[5] California Environmental Protection Agency. Air Resources Board, Short-Lived Climate Pollutant Reduction Strategy (Mar. 2017), available at https://ww2.arb.ca.gov/sites/default/files/2017-08/final_slcp_report.pdf.



As manufacturing of virgin CFCs and HCFCs has been phased out, governments across the globe have encouraged the transition from older generation CFCs and HCFCs to third generation hydrofluorocarbons (HFCs) which are not ozone-depleting, but still have dramatic climate impacts. For example, the GWP of one of the most common HFCs, R-134a, is 1,430 and the widely used HFC-410a refrigerant has a GWP of 2,088 times that of carbon dioxide. Although HFCs do not destroy the ozone layer, the GWPs are comparable to the GWPs of the older generation ozone-depleting HCFC materials, such as the widely used second-generation HCFC R-22 which has a GWP of 1,810.

An inconvenient fact is that all refrigeration and other equipment using halocarbons (whether ODS or high-GWP substitutes) will eventually leak those chemicals into the atmosphere where they will deplete the ozone layer and cause global warming. In fact, the legally permissible leak rate for industrial refrigeration equipment is a staggering 30% per year.[6] Scientifically speaking, unless these high-GWP materials are reclaimed and destroyed, every pound of halocarbon manufactured will eventually find its way into the atmosphere and cause stratospheric ozone depletion and global warming.

The sheer volume of halocarbon stocks in the U.S. is sobering. For example, in 2006, there were an estimated 530,000 supermarkets worldwide, a large proportion of which are in the U.S., containing roughly 546,000 metric tons of refrigerant. In 2015, U.S. emissions just from commercial refrigeration equipment were estimated at 41.6 million metric tons of carbon dioxide equivalent (MMT CO2e).[7] By some estimates, existing banks of a single widely used refrigerant, R-11 (GWP 4,750), are in the range of 1.68 million tons just in the United States.[8] The opportunity to reclaim and destroy this amount of R-11 alone represents 7.98 billion tCO2e, equivalent to taking over one billion cars off the road for a year. And there are many dozen varieties of CFCs

[6] *Protection of Stratospheric Ozone: Update to the Refrigerant Management Requirements under the Clean Air Act*, 81 Fed. Reg. 82272 (Nov. 18, 2016); 40 C.F.R. § 82.157, Subpart F.

[7] Source: EPA Fact Sheet, *Transitioning to Low-GWP Alternatives in Commercial Refrigeration.*

[8] *See* IPCC/TEAP Special Report: *Safeguarding the Ozone Layer and the Global Climate System*, Intergovernmental Panel on Climate Change, 166 (Feb 5, 2003).

and HCFCs in widespread use in the refrigeration, fire protection and product manufacturing sectors.

By providing incentives for the reclamation and capture of ODS refrigerants and other substitute halocarbons, California can leverage multiple environmental benefits that directly benefit California and California residents. Foremost, destroying older generation CFCs and HCFCs preserves the ozone layer by permanently eliminating ODS concentrations that escape to and react in the stratosphere. Protecting the ozone layer avoids a range of impacts to California such as higher incidents of skin cancer, cataracts, asthma, and impacts to vegetation and crops. As CARB has previously recognized: "The stratospheric ozone layer shields the earth from harmful ultraviolet (UV) radiation. Depletion of the Earth's ozone layer allows a higher penetration of UV radiation to the earth's surface. The increase in UV radiation leads to greater incidence of skin cancer, cataracts, and impaired immune systems, as well as reduced crop yields and diminished ocean productivity. Because chemical reactions that form tropospheric ozone are driven by UV radiation, it is conceivable that a reduction in stratospheric ozone can also result in an increase in photochemical smog, due to the increased UV radiation."[9]

CARB has been a leader in ozone layer protection by encouraging destruction of older halocarbons through the A.B. 32 cap-and-trade program offsets protocol, which has been a notable success in incentivizing the reclamation and permanent destruction of ODS materials. The ODS protocol has been extraordinarily effective in creating a price driver for project developers to locate, secure and destroy older high-GWP halocarbons, which has benefitted California by incentivizing the reclamation and permanent destruction of ODS on the scale of a cumulative total of 17,088,886 tons of carbon dioxide equivalent (10,752,176 from compliance projects and 6,336,710 from early action projects) which otherwise would have reached the atmosphere, impacted the ozone layer, exacerbated global warming, and directly harmed California.[10]

However, the existing ODS Protocol is not reaching its full potential.[11] For example, the current ODS Protocol does not credit destruction of HCFC refrigerants (although certain foam-blowing HCFCs are eligible) despite the fact that HCFC manufacturing is now phased out on a national level. This limitation is particularly acute because HCFCs have largely replaced CFCs in the refrigerant marketplace and represent the greatest mass volume of high-GWP gases that could

[9] California Environmental Protection Agency, Air Resources Board, Environmental Impact Assessment of Selected Halogenated Chemicals, Staff Report, March 2008, available at https://www.arb.ca.gov/research/reactivity/voc0308.pdf.

[10] Source: ARB Offset Credits Issued, Last Updated: June 27, 2018, available at https://www.arb.ca.gov/cc/capandtrade/offsets/issuance/arb_offset_credit_issuance_table.pdf.

[11] CARB Offset Protocol, *Ozone Depleting Substances Projects Destruction of U.S. Ozone Depleting Substances Banks* (Adopted: Nov. 14, 2014).

be reclaimed and destroyed under the cap-and-trade program if the protocol were expanded.[12] As noted above, eventually every ton of HCFC will leak into the atmosphere – eroding the ozone layer and causing global warming – unless reclaimed and destroyed.

CARB also must be concerned about what technologies are permitted under the current ODS Protocol to destroy halocarbons. Historically, ODS has been destroyed using thermal incineration furnaces at hazardous waste facilities. However, superior technologies such as plasma-arc pyrolysis have now become available which are much cleaner and more efficient than incineration. New plasma dissociation technologies do not produce by-products such as dioxins and furans and liquid sludge that incinerators cannot as effectively control. In addition, the new state-of-the-art pyrolysis destruction technologies can be dedicated to gas destruction whereas hazardous waste incinerators often mix ODS with a stew of hazardous wastes which creates pollution and regulatory issues.

B. A-Gas Americas

A-Gas Americas, and its affiliates Reclamation Technologies, Inc. ("***RemTec***"), Coolgas, Inc. ("***Coolgas***") and Raprec Refrigerants, Inc. ("***Raprec***"), have been leaders in the refrigerant reclamation business since 1986, and have developed numerous carbon offsets projects under the California cap-and-trade ODS Protocol. As EPA-certified refrigerant recyclers, A-Gas reclaims, recycles and (where carbon value is available) destroys halocarbons from a range of end-use sources, including refrigeration equipment, air conditioning, foam insulation, medical devices and fire suppression. Used refrigerants can be reclaimed from cooling systems at various commercial, industrial and automotive sources, such as residential homes, big box stores, grocery stores, universities, warehouses, industrial facilities, government and commercial office buildings, airports, and hospitals.

A-Gas Americas is also the leading expert in destruction of environmentally damaging halocarbons. The company has built two state-of-the-art Plascon® plasma arc destruction units at its reclamation facility in Bowling Green, Ohio, which are capable of destroying old, environmentally damaging halocarbons using pyrolysis to achieve a 99.9999% destruction efficiency. A-Gas has developed numerous ODS offset projects itself, and destroys ODS on behalf of other project developers.

II. Comments on Offset Eligibility

A.B. 398, passed by the California legislature and signed by Governor Brown on July 25, 2017, explicitly endorsed the CARB cap-and-trade program and extended the program through

[12] California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms, Cal. Code Reg. § 95800 *et seq.*

2030.[13] In doing so, the legislature specifically approved the use of offsets in the cap-and-trade program, but at the same time established offset credit limits (*i.e.*, quotas) for the use of offset credits by compliance entities.

For compliance periods between 2021-2025, compliance entities may only use offsets for 4% of the compliance obligation, and for compliance periods between 2026-2030, offsets are limited to 6% of compliance obligations. A.B. 398 also established a sub-quota for a newly defined class of offset projects; specifically, for compliance periods between 2021 and 2030, there will be a sub-quota for each yearly offset quota under which "no more than one-half [of the allowable offsets] may be sourced from projects that do not provide direct environmental benefits in state."[14] Although A.B. 398 draws a distinction between offset projects depending on whether such projects "provide direct environmental benefits in state" (referred to in the staff proposal as "DEBS"), the legislature did not provide further clarification other than describing DEBS offset projects as those that provide a "reduction or avoidance of emissions of any air pollutant in the state."[15] A-Gas Americas offers the following suggestions with regard to applying the new mandates of A.B. 398 to the existing CARB cap-and-trade program.

A. Calculating Offset Quotas

As an initial matter, CARB must interpret A.B. 398 in terms of how many non-DEBS offsets can be used in a compliance period to fill the sub-quota when an entity does not use its full quota of offsets generally. One reading is that the percent of non-DEBS offsets is limited to half of the maximum percentage stated by the legislature for the offset quota, *i.e.*, 2 or 3 percent,

[13] Cal. Health and Safety Code (HSC) § 38501(i) ("It is the intent of the Legislature that the State Air Resources Board extend the market-based compliance mechanism adopted pursuant to subdivision (c) of Section 38562 from January 1, 2021, to December 31, 2030, inclusive") (as amended by A.B. 398 section 1); *see also* 38562(c)(2) (CARB "may adopt a regulation that establishes a system of market-based declining annual aggregate emissions limits for sources or categories of sources that emit greenhouse gases, applicable from January 1, 2012, to December 31, 2030, inclusive, that the state board determines will achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions, in the aggregate, from those sources or categories of sources") (as added by A.B. 398 section 4).

[14] *See* HSC § 38562(c)(2)(E) ("In adopting a regulation applicable from January 1, 2021, to December 31, 2030, inclusive, pursuant to this subdivision, the state board shall do all of the following: . . . (i) Establish offset credit limits according to the following: (I) From January 1, 2021, to December 31, 2025, inclusive, a total of 4 percent of a covered entity's compliance obligation may be met by surrendering offset credits of which no more than one-half may be sourced from projects that do not provide direct environmental benefits in state. (II) From January 1, 2026, to December 31, 2030, inclusive, a total of 6 percent of a covered entity's compliance obligation may be met by surrendering offset credits of which no more than one-half may be sourced from projects that do not provide direct environmental benefits in the state.") (as added by A.B. 398 section 4).

[15] *See* HSC § 38562(c)(2)(E)(ii) ("For purposes of this subparagraph, 'direct environmental benefits in the state' are the reduction or avoidance of emissions of any air pollutant in the state or the reduction or avoidance of any pollutant that could have an adverse impact on waters of the state.") (as added by A.B. 398 section 4).

depending on the compliance period, which would be one half of the maximum offsets quota of 4 and 6 percent respectively. The alternative reading would limit the non-DEBS sub-quota to one-half the number of offsets (DEBS and non-DEBS) actually used by a compliance entity in a particular compliance period, *i.e.*, no more than half of the offsets used at any time can be non-DEBS.

Because of the important role that offset projects play in incentivizing investment in low-carbon activities, their cost-containment function, and the numerous co-benefits, A-Gas encourages CARB to interpret the legislature's mandate liberally so as to not artificially restrict offsets beyond the sub-quotas that are established in A.B. 398. In other words, compliance entities should be able to use non-DEBS offsets to the maximum amount of the numerical sub-quota (2% or 3% of the compliance entity's total compliance obligation) regardless of how many DEBS offsets the compliance entity chooses to surrender in satisfaction of its compliance obligation. A more restrictive reading would not be justified by the legislative language in A.B. 398.

B. Retroactive Quota Reclassification

CARB staff have proposed to interpret A.B. 398 as requiring CARB to reclassify carbon credits from projects that have already been initiated prior to the legislative amendment as either DEBS or non-DEBS projects for purposes of the new offsets quota, corresponding to the new sub-quotas. *See* CARB Staff Proposal, Additional Regulatory Text in Section 95854 "Direct Environmental Benefits in State" (stating that "CARB staff will also need to apply criteria ***retroactively*** to the tens of millions of offset already issued in the system that may be used for compliance surrender for emissions for the year 2021 and forward") (emphasis added).

A-Gas disagrees that retroactive reclassification of projects is mandated by A.B. 398 and suggests that CARB apply the new DEBS distinction prospectively for projects listed after the passage of A.B. 398. There are several important reasons for grandfathering existing projects in this manner. First, there is no indication in A.B. 398 that the legislature intended to penalize existing projects by retroactively imposing a new requirement that the project sponsors previously could not readily have anticipated. Legislation should not be interpreted to have retroactive effect unless it appears clearly that the legislature intended such a result. Second, retroactive changes to any regulatory program tend to undermine the stability and integrity of the program when such changes penalize participants for reliance on existing rules. Third, the legislature, and CARB, have often appropriately embraced the need to encourage and reward early action. For example, HSC § 38562(b)(1) expressly directs CARB to "Design the [cap-and-trade] regulations . . . in a manner that . . . encourages early action to reduce greenhouse gas emissions." Retroactively penalizing early actors would be contrary to past signals from California that investors in pollution reduction solutions can rely on the stability and inherent good faith of California laws. Finally, because the number of offset credits that would potentially be reclassified would be relatively small (presumably retroactive classification would apply only to offset credits that have been

issued but not yet retired for compliance purposes), it would not be worth jeopardizing the integrity of the cap-and-trade system by undermining investment-backed reliance interests when balanced against implementing the newly imposed DEBS criterion.

C. Recognize ODS as In-State Benefit

Regardless of the retroactive or prospective application of the new DEBS criterion, all ODS destruction projects should inherently qualify as "in state" or DEBS credits for purposes of the new offset sub-quotas. A key distinction between ODS destruction and some other types of offset projects is that destroying older high-GWP halocarbons also achieves significant benefits to Californians, in addition to climate change benefits, by eliminating pollutants that otherwise would degrade the stratospheric ozone layer and directly cause health and environmental impacts in California

California has already recognized the non-GHG health benefits to Californians associated with reducing ODS as a matter of environmental science. In its evaluation of the health benefits resulting from ODS destruction under CARB's ODS Protocol specifically, the California health department found that: "Stratospheric ozone naturally protects life on earth from UV rays, which are known to have damaging health effects. Malignant melanoma is the most lethal of these effects . . . Squamous and basal cell carcinomas (also known as non-melanoma skin cancer (NMSC)) are also thought to be partially caused by exposure to UV rays, as is eye damage: cataracts, squamous cell cancer of the cornea, and other damage to the cornea. Over-exposure to sunlight has also been found to suppress immune response, making people more susceptible to infectious disease and skin tumors. These health effects are well-established, and are strongly tied to UV radiation exposure . . . the number of excess skin cancers in the U.S. would be dramatically reduced with increased stringency of the control policy, and with the possibility of eventually returning to baseline levels (i.e., 1979-1980 levels) under the Montreal adjusted protocol [which is associated with] reduction in disease burden attributable to restoring the ozone layer."[16] The same department of health impacts analysis concluded that "The aim of the ODS proposal [protocol] is to contribute to replenishing the ozone layer (or, at minimum, curtailing further damage). If the proposal is successful and there is a decrease in UV radiation exposure in California, there are likely to be associated health benefits in the diseases listed above."

The California health department also identified non-health environmental benefits and avoided negative impacts associated with ODS destruction under the CARB protocol in the following passage: "The replenishment of the ozone layer may also result in indirect changes to human health, via changes in agricultural and ecological systems on which humans are dependent . . . increasing UV exposure has been shown to decrease the immunity of vegetation to pest

[16] *See* Public Health Assessment of a Cap-and-Trade Framework, California Department of Public Health (Dec. 2010) at 42-44, available at https://www.arb.ca.gov/cc/ab32publichealth/cdph_final_hia.pdf.

infestation. Presumably, this would increase the use of pesticide application, which could have detrimental human health impacts [and] agricultural and ecological systems change could increase bacterioplankton stress in water, leading to changes in the fish and amphibian populations in aquatic ecosystems, and disrupt nutrient cycles Efforts to halt increases in UV exposure could mitigate potential negative ecological impacts associated with increased UV exposure."[17]

The non-GHG benefits of ODS destruction, which are particularly beneficial for sunny states like California, are also well documented in the scientific record underlying the federal Clean Air Act and Montreal Protocol. For example, the U.S. EPA has found that "Stratospheric ozone depletion decreases the atmosphere's ability to shield life on the Earth's surface from the sun's UV radiation. The links between stratospheric ozone depletion and public health concerns are well established. Emissions of ODS lead to chemical reactions that reduce the amount of ozone in the stratosphere. Less ozone in the stratosphere means that more UVA and UVB radiation reaches the earth's surface and is incident on exposed organisms, including humans. Adverse health effects associated with exposure to UV radiation include skin cancer, cataracts, and immune suppression. The Scientific Assessment of Ozone Depletion, prepared by the Scientific Assessment Panel to the Montreal Protocol, and Environmental Effects of Ozone Depletion and its Interactions with Climate Change, prepared by the Environmental Effects Assessment Panel to the Montreal Protocol provide comprehensive information regarding the links between emissions of ODS, ozone layer depletion, UV radiation, and human health effects . . . The most common forms of skin cancer are strongly associated with UV radiation, and UV exposure is the most preventable cause of skin cancer (U.S. Department of Health and Human Services. The Surgeon General's Call to Action to Prevent Skin Cancer. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General; 2014). Skin cancer is the most common form of cancer in the United States, with more than 3.5 million new cases diagnosed annually (American Cancer Society, Cancer Facts and Figures, 2015). Rates for new cases of melanoma, the most serious form of skin cancer, have been rising on average 1.4 percent each year over the last 10 years (National Cancer Institute . . . Non-melanoma skin cancers are less deadly than melanomas, but if left untreated they can spread, causing disfigurement and more serious health problems . . . Other UV-related skin disorders include actinic keratoses and premature aging of the skin . . . Research has shown that UV radiation increases the likelihood of certain cataracts . . . Cataracts are a form of eye damage in which a loss of transparency in the lens of the eye clouds vision. If left untreated, cataracts can lead to blindness. Although curable with modern eye surgery, cataracts diminish the eyesight of millions of Americans. Other kinds of eye damage caused by UV radiation include

[17] *See* Public Health Assessment of a Cap-and-Trade Framework, California Department of Public Health (Dec. 2010) at 43, available at https://www.arb.ca.gov/cc/ab32publichealth/cdph_final_hia.pdf.

pterygium (i.e., tissue growth that can block vision), skin cancer around the eyes, and degeneration of the macula which contains the part of the retina where visual perception is most acute."[18]

The California legislature has itself recognized that, while the problems associated with ozone depletion are global, California is directly affected in a special manner within the state, and therefore has passed legislation addressing the in-state benefits of ODS destruction upon finding that: "The Legislature finds and declares the following: . . . (1) For the first time in human history, the use and disposal of certain manmade products are actively destroying a layer of the earth's atmosphere without which human life cannot continue to exist. (2) These products, known as chlorofluorocarbons and halons, have already begun to deplete the ozone layer which protects human and other life forms from cancer-causing ultraviolet radiation. ***Above California, the ozone shield has been depleted about 3 percent over the last 20 years*** . . . (5) It is ***essential to the health and safety of all Californians*** to take such steps as are necessary to further decrease and halt the destruction of the ozone layer by CFCs and halons.").[19] Conversely, because California is directly impacted by stratospheric ozone depletion, the benefits of ODS destruction, which helps stabilize the ozone layer, will have direct benefits in state by counteracting the harmful effects of ozone depletion. As a result, logically all ODS projects should be considered DEBS.

Not only does halocarbon destruction prevent potent greenhouse gases from reaching the atmosphere, but destroying older generation halocarbons also (1) provides financial incentives to help end-users afford to transition away from older generation refrigerants and fire fighting gases to newer substitutes that do not degrade the ozone layer or cause global warming, (2) helps communities and businesses transition to newer, more energy efficient and less leaking equipment, saving money on the cost of refrigerant replacement and electricity to run equipment, (3) benefits all Californians, but particularly children and vulnerable individuals, by reducing ground-level ozone and (4) benefits all Californians, but particularly children and vulnerable individuals, by avoiding conventional emissions fossil-fuel power plants in their communities through the adoption of newer, more energy efficient air conditioning and refrigeration equipment.

For all of the above reasons, it is clear that the California legislature, other California agencies, the federal government and the international community have all recognized that incentives to reclaim and destroy older halocarbons are essential to preserving the ozone layer and avoiding the harms which directly fall on California and California residents in particular. Accordingly, ODS destruction, whether through the ODS cap-and-trade protocol or other programs or voluntary efforts, should be recognized as squarely within the legislative intent in

[18] *Protection of Stratospheric Ozone: Update to the Refrigerant Management Requirements Under the Clean Air Act; Final Rule*, 81 Fed. Reg. 82272, 82278 (Nov. 18, 2016) (citations omitted).

[19] *See* HSC § 44470(a)(2) (emphasis added).

A.B. 398 of prioritizing projects with direct in-state benefits. To the extent CARB must classify offset projects for purposes of the DEBS sub-quota, ODS projects should be considered DEBS.

D. Source ODS Anywhere in U.S.

Because the co-benefits of ODS destruction (in addition to the GHG benefits) directly benefit California, it should not matter where ODS material is sourced for an ODS destruction offset projects. In other words, because ozone depleting substances are global pollutants (similar to GHGs in that respect) the destruction of older halocarbon refrigerants that are reclaimed from an office building in Arizona directly benefits California in the same way as does destruction of refrigerants sourced from a Wal-Mart in California.

Currently the CARB ODS Procotol qualifies ODS material sourced anywhere in the United States. This is sound policy, as it supports California's leadership role in addressing concerns about ozone layer depletion and, because of California's outsized economic influence, helps accelerate the entire U.S. halocarbon market away from older high-GWP materials to next-generation refrigerants and other materials that are more effective and earth-friendly. There is nothing in A.B. 398 that indicates that the legislature intended to restrict ODS projects or cede California's leadership in the effort to transition away from early generation halocarbons. Accordingly, CARB should continue to credit ODS destruction of high-GWP chemicals sourced from anywhere in the United States, and all such projects should be classified as DEBS projects.

E. Credit ODS Destruction Anywhere in U.S.

For similar reasons, it should not matter where ODS material (or HFCs) are actually destroyed, as long as the pollutants are in fact destroyed using state-of-the-art technology. Practically speaking, if older refrigerants are sourced from government buildings in Sacramento and transported to Ohio for destruction, Californians will still enjoy the same environmental benefits in terms of reducing global warming, protecting the ozone layer, and transitioning the national refrigerants market to more environmentally friendly substitutes. Destruction projects, regardless of location, will allow Californians access to more efficient, cost-effective and earth-friendly refrigeration equipment as older chemicals are destroyed and supply-demand market forces influence a transition to next-generation materials. There is no indication in A.B. 398 that the legislature intended to limit where ODS or HFC material was to be destroyed, particularly where there are currently few if any certified destruction facilities in California. To the contrary, as discussed below, the legislature is greatly concerned with incentivizing the reduction of short-lived climate pollutants (SLCPs) and in particular, promoting HFC destruction.

Limitations on the location of destruction facilities would make no policy or practical sense. However, if CARB does intend to restrict the location of ODS destruction facilities, CARB should provide clarity early on in the A.B. 398 implementation process so that recycling companies can respond and plan the needed capital investment if financially viable.

III. Comments on Offset Protocols

A. Expand ODS Protocol to Include HCFCs

The current ODS Protocol does not credit destruction of HCFC refrigerants (although certain foam-blowing HCFCs are eligible).[20] By limiting the protocol in this way, California is missing the opportunity to incentivize the destruction of many millions of tons of carbon reduction and forfeiting the associated in-state ozone and global warming benefits. HCFCs are second-generation halocarbons that largely replaced CFCs in the marketplace, and thus the size of the opportunity is considerable in terms of CO2e reduction.

Indeed, the exclusion of HCFCs from the current ODS Protocol is arguably inconsistent with CARB's legislative mandate. The California legislature has provided clear direction to implement the most cost-effective emissions reduction measures and maximize co-benefits. *See, e.g.*, HSC § 38501(h) ("It is the intent of the Legislature that the State Air Resources Board design emissions reduction measures to meet the statewide emissions limits for greenhouse gases established pursuant to this division in a manner that minimizes costs and maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality") (as reaffirmed by A.B. 398 section 1).[21]

Destruction of halocarbons is one of the largest and most cost-effective measures that CARB can incentivize. ODS destruction is technically feasible now and, as California has recognized, delivers multiple co-benefits beyond greenhouse gas reduction. As discussed above, not only does halocarbon destruction prevent potent greenhouse gases from reaching the

[20] *See* CARB ODS Protocol (2014): 2.2.1. Refrigerant Sources (a) Eligible refrigerants must originate from domestic U.S. supplies. Imported refrigerant is not eligible under this protocol. (b) Only destruction of the following ODS refrigerants is eligible to generate ARB or registry offset credits under this protocol: (1) CFC-11; (2) CFC-12; (3) CFC-13; (4) CFC-113; (5) CFC-114; and (6) CFC-115.

[21] *See also* HSC § 38562(a) (directing CARB to "adopt greenhouse gas emissions limits and emissions reduction measures by regulation to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions"); 38562(b)(1) (CARB must "[d]esign the regulations . . . in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California"); 38562(b)(4) (CARB must design regulations that "complement" efforts to meeting ambient air quality standards such as those for ground-level ozone); 38562(b)(5) (CARB must consider cost-effectiveness of measures); 38562(b)(6) (CARB must consider "overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health"); 38562(c)(2) (CARB "may adopt a regulation that establishes a system of market-based declining annual aggregate emissions limits for sources or categories of sources that emit greenhouse gases, applicable from January 1, 2012, to December 31, 2030, inclusive, that the state board determines will achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions, in the aggregate, from those sources or categories of sources").

atmosphere, but destroying older generation halocarbons (1) benefits the ozone layer, (2) helps end-users afford to transition away from older generation refrigerants and fire fighting gases to newer substitutes that do not degrade the ozone layer or cause global warming, (3) helps communities and businesses save money by transitioning to newer, more energy efficient and less leaking equipment, and (4) benefits all Californians, but particularly children and vulnerable individuals, by reducing ground-level ozone and conventional emissions fossil-fuel power plants in their communities.

Accordingly, A-Gas encourages CARB to modify the ODS Protocol to qualify destruction of any high-GWP ozone-depleting material that would otherwise be released to the atmosphere. This list should include common CFCs and HCFCs used in refrigeration, air conditioning, and fire protection. A-Gas is available to consult on any technical questions CARB may have relating to the U.S. halocarbon market, the nature of halocarbon chemicals, or destruction technologies.

B. Create HFC Destruction Program

As reaffirmed by A.B. 398, California has committed to a leadership role in addressing global warming through incentives to reduce greenhouse gases, as well as targeting ozone depleting substances that also have high global warming potential. *See, e.g.*, HSC § 38501(c) (cap-and-trade program "will continue this tradition of [national and international] environmental leadership") (as reaffirmed by A.B. 398 section 1). Separately, Health and Safety Code § 39730.5, added by S.B. 1383 (Lara) on September 19, 2016, directs CARB to reduce HFCs by 40% below 2013 levels by 2030 as part of its short-lived climate pollutants (SLCP) strategy.[22] Consistent with its legislative authority and mandate, CARB has recognized and taken a leadership role in addressing SLCP's, which contribute disproportionately to global warming and other negative impacts. Eliminating SLCP's can be a particularly effective strategy for avoiding the worst effects of climate change, particularly in the near term, by reducing the immediate impact of short-lived pollutants. In A.B. 398, the legislature expressed support for funding programs for SLCP reduction and authorized use of cap-and-trade auction proceeds for that purpose.[23]

Halocarbons, including hydrofluorocarbons (HFCs), are a particularly potent type of SLCP. In fact, HFCs are identified as "super-pollutants" in pending California legislation. *See*

[22] *See* HSC § 39730.5(a) ("No later than January 1, 2018, the state board shall approve and begin implementing the comprehensive short-lived climate pollutant strategy developed pursuant to Section 39730 to achieve a reduction in the statewide emissions of methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030.").

[23] *See* HSC § 38590.1(a) ("It is the intent of the Legislature that moneys collected from the auction or sale of allowances pursuant to a market-based compliance mechanism established pursuant to the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500)) shall be appropriated to include, but need not be limited to, the following priorities at the time an expenditure plan is adopted: . . . (5) Short-lived climate pollutants") (added by A.B. 398 Sec. 9).

California Cooling Act, S.B. 1013 (Lara) ("Commonly known as hydrofluorocarbons, HFCs or F-gases, these super-pollutants are the fastest growing source of greenhouse emissions in California and around the world"); *see also* CARB, Short-Lived Climate Pollutant Reduction Strategy (Mar. 2016) ("F-gases, specifically HFCs, are the fastest growing source of GHG emissions in California and globally"). Although HFCs are targeted internationally by the recent Kigali Amendment to the Montreal Protocol,[24] the United States has not yet ratified national participation, thus creating a leadership opportunity for California. In fact, Senator Lara and Governor Jerry Brown accepted the Climate and Clean Air Award last year at the United Nations Climate Conference in Germany on November 12, 2017, in recognition of California's bold action on HFCs.

But California needs to effectuate its aspirations by incentivizing reclamation and destruction of HFCs and other high-GWP halocarbons. A-Gas Americas encourages CARB to promote HFC reduction by adopting several effective policies. First, within the cap-and-trade program, CARB should develop an offset protocol for HFC destruction similar to the existing ODS protocol. (As noted above, CARB should also expand the existing ODS protocol, which focuses on CFCs, to include HCFCs as well.) The ODS protocol has been extraordinarily effective in creating a price driver for project developers to locate, secure and destroy older high-GWP halocarbons, which has benefitted California by incentivizing the reclamation and permanent destruction of ODS equivalent to a cumulative total of 17,088,886 tons of carbon dioxide equivalent which otherwise would have reached the atmosphere and exacerbated global warming.[25] CARB should also consider creating a stand-alone program for halocarbon reclamation and destruction (including HFCs as well as CFCs and HCFCs). This program could be funded from auction proceeds or other funding sources available for emissions reduction, energy efficiency, and/or environmental benefits.

C. Require Advanced Destruction Technology

Currently ARB allows ODS to be destroyed at older thermal incineration units that burn hazardous waste.[26] The ODS Protocol also allows ODS destruction at TEAP-certified destruction

[24] A global HFC production and consumption phasedown was agreed to on October 15, 2016, in Kigali, Rwanda, under the rubric of the Montreal Protocol.

[25] Source: ARB Offset Credits Issued, Last Updated: June 27, 2018, https://www.arb.ca.gov/cc/capandtrade/offsets/issuance/arb_offset_credit_issuance_table.pdf.

[26] CARB ODS Protocol (2014): 2.1. Eligible Destruction Facilities (a) The end fate of the ODS must be destruction at either: (1) An approved HWC [hazardous waste combustor] subject to the RCRA and with a RCRA permit for the ODS destruction facility stating an ODS destruction efficiency of at least 99.99%; or (2) A transformation or destruction facility that meets or exceeds the Montreal Protocol's TEAP standards provided in the Report of the Task Force on Destruction Technologies. (A) A facility must demonstrate DRE of 99.99% and emission levels consistent with the guidelines set forth in the TEAP report. (B) A facility must have been certified by a third party no more than three years prior to the offset project commencement date and must show that it maintains its operational status as stated in the certification.

facilities, however in practice a significant amount of ODS is burned at incinerators. With the availability of state-of-the-art technology, such as plasma dissociation, it is no longer necessary to burn ODS with other hazardous waste using outdated hazardous waste combustors.[27]

The Plascon plasma destruction units built by A-Gas are the most efficient destruction technology available today, with 99.9999% efficiency. The outputs of plasma destruction of ODS are negligible amounts of CO2 and saline water.[28] Thus, plasma destruction is highly preferable to thermal incineration, which is less efficient and involves commingling with hazardous waste streams. Accordingly, CARB should revise the ODS Protocol to define eligible destruction technologies as those that achieve state-of-the-art destruction efficiency and are not commingled with hazardous waste streams.

IV. Conclusion

Once again, A-Gas Americas thanks CARB for this opportunity to submit comments, and we hope that CARB finds them helpful. We would be happy to provide additional information upon request. Please feel free to contact me directly or liaison with our policy counsel Max Williamson at (202) 256-6155 or maxwilliamson@williamsonlawpolicy.com.

Sincerely,

Monte Roach, CEO

cc: Mary Nichols (CARB) (*via email*)
(mnichols@arb.ca.gov)

[27] When the Montreal Protocol was first implemented in the federal Clean Air Act 25 years ago, the U.S. EPA noted that no destruction technologies existed to destroy chemically stable halocarbons; however, EPA recognized that eventually technologies would be developed to destroy halocarbons, which would be preferable even to recycling. *See* 56 Fed. Reg. 5910, 5913 (Feb. 13, 1991) ("Since these chemicals are difficult to destroy, it is likely that they will be eventually released although at a later point in time."); *id*. at 5913 n.2 ("The Agency is assessing the possibility that such chemicals could either be destroyed or transformed into other chemicals at a later date, thus diminishing their eventual impact on the ozone layer").

[28] Plascon Technology Overview, available at http://www.plascon.com.au/technology-overview.html.