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California Air Resources Board
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Subject: NRDC and IGSD Comments on the HFC portions of ARB's Proposed SLCP Reduction Strategy

The Natural Resources Defense Council (NRDC) and the Institute for Governance & Sustainable Development (IGSD) appreciate the opportunity to comment on the California Environmental Protection Agency Air Resources Board's (ARB's) "Proposed Short-Lived Climate Pollutant Reduction Strategy," published on April 11, 2016. As Governor Brown and ARB recognize, climate change is already causing harm to people in California and beyond. Swift and strategic action to reduce emissions of all greenhouse gases is critical. We thus applaud ARB for undertaking this initiative aimed at three classes of short-lived but extremely potent greenhouse gases: hydrofluorocarbons (HFCs), methane, and black carbon. As ARB notes, California must achieve deep reductions in these short-lived climate pollutants (SLCPs) in order to reach its future climate goals. Action by California will also stimulate the development and deployment of next-generation technology and will inspire other states and nations to follow the example and enact complementary regulation and incentives.

We urge ARB to follow through on its Proposed Reduction Strategy by adopting the regulations needed to ensure rapid reduction in all three classes of pollutants. In this comment, we address in detail the specific measures ARB has proposed to reduce HFC emissions. In general, ARB appears on track to reduce HFC emissions in California 40% by 2030, the goal established early in its planning process. Our comments also identify some additional actions that can be undertaken at little cost and administrative burden, which will have a significant influence on reducing SLCP emissions.

NRDC and IGSD urge California to consider whether it can accelerate the reduction in HFC use and achieve a larger emissions reduction by 2030. The North American proposal to amend the Montreal Protocol – backed by Canada, Mexico, and the United States – would require a 70% cut in nation-wide HFC consumption and production in 2030 (from a 2011-2013 average baseline). California should work to further understand how its emissions reduction goal of 40% would be affected by an overlapping and deeper national consumption target in that same year, and if the confluence calls for a stricter California target.

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Financial Incentives

NRDC and IGSD are encouraged by Governor Brown's proposal of $20 million for low global warming potential (GWP) incentives directed at commercial refrigeration systems. The funds, if approved, will greatly assist the transition to energy-efficient, low-GWP alternatives in the refrigeration sector – one of the leakiest, most-harmful applications of HFCs. The funding will go a long way towards helping California reach its proposed GWP cutoff of 150, a much deeper cut than the US Environmental Protection Agency (EPA) has required under the Significant New Alternatives Policy (SNAP) Program and one NRDC and IGSD find achievable and greatly beneficial.

High-GWP Refrigerant Prohibitions in New Stationary Systems

ARB should adopt its proposed prohibitions in three classes of stationary equipment. Doing so will ensure that California moves earlier than, or in some cases simultaneously but more ambitiously than, national measures under EPA's SNAP program.

Nonresidential Refrigeration

Limiting the GWP of refrigerants used in new nonresidential refrigeration systems to 150 in 2020 will dramatically decrease California's overall HFC emissions. California reports that nonresidential refrigeration will comprise nearly half of its GWP-weighted HFC emissions by 2030, or about 30 MMTCO_2-eq using 20-year GWPs. These emissions will occur despite California's successful refrigerant management program (RMP) and EPA's restriction on numerous high-GWP refrigerants like R-404A and R-507A, starting between 2017 and 2020.[1]

These projected emissions offer a clear mandate for ARB to deepen EPA's regulations by adopting a GWP limitation of 150 in 2020. ARB cites 300,000 pieces of CO_2 or hydrocarbon equipment used in commercial refrigeration, as well as 250 stores using CO_2-based refrigeration systems. In addition, the Climate and Clean Air Coalition (CCAC) has conducted numerous case studies on designing new and retrofit commercial systems without high-GWP HFCs. Time after time, studies demonstrate that more-efficient, lower-GWP solutions may be installed successfully in a wide range of commercial applications.[2]

But ARB also correctly points out that these systems are usually more expensive than obsolete HFC-based versions and that customers are unfamiliar with many of the technology options available. For those two reasons, Governor Brown's proposed $20 million to incentivize the transition to sub-150-GWP commercial refrigeration systems will be important to the program's success.

Air Conditioning (Nonresidential and Residential)

Limiting the GWP of refrigerants used in air conditioners (both residential and nonresidential) to 750 in 2021 is ambitious, achievable, and will force industry forward. In this case, ARB proposes a consistent prohibition for all types of air conditioning, including direct

[1] 80 Fed. Reg. 42,870 at 42,872-3

[2] *Low-GWP Alternatives in Commercial Refrigeration: Propane, CO2 and HFO Case Studies*. UNEP, 2014. http://www.ccacoalition.org/en/resources/low-gwp-alternatives-commercial-refrigeration-propane-co2-and-hfo-case-studies

commercial systems like rooftop units, indirect commercial systems like chillers, and direct residential systems like central air conditioners, heat pumps, portable air conditioners, window air conditioners, mini-split air conditioners, and more.

For chillers, ARB's proposal would advance EPA's recent SNAP proposal by three years. Customers in California, however, would have no trouble finding acceptable chillers: at least two manufacturers have committed to debuting a full line of chillers compatible with sub-750-GWP refrigerants between now and the end of 2018.[3,4]

For direct residential and commercial air conditioners, ARB's proposal is a landmark step forward. EPA has yet to reevaluate the acceptability of R-410A, the dominant air conditioning refrigerant, in any direct space conditioning application. But R-410A needs to be addressed—its GWP of 2088, coupled with its ubiquitous use across the US, make it a serious contributor to SLCP emissions.

California's proposed phasedown aligns well with expected updates to safety standards for the use of new refrigerants. By 2018, the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) is expected to complete an update of its Standard 15 to accommodate A2L-flammability refrigerants, such as HFC-32 and R-452B, which have GWPs less than 750. Underwriters Laboratories (UL) Listing for direct air conditioning products using those refrigerants is expected to become available at approximately the same time. California will need to update its building codes to reflect the revised ASHRAE Standard 15 as soon as possible after its completion, to allow the sale of air conditioners using refrigerants with a GWP lower than 750 in California in advance of ARB's ban in 2021.

Several manufacturers are currently targeting 2023 as the year of introduction for direct air conditioning products with A2L refrigerants. If California updates its building codes as described in 2018, ARB's proposal advances the business-as-usual case by as many as 5 years, securing a considerable amount of additional HFC emissions savings. Faster action by ARB will help consumers avoid owning technology that will be increasingly expensive and hard to maintain. Parts and refrigerants will become unavailable and fewer technicians will have the tools to maintain last-generation air conditioning appliances.

Residential Refrigeration

NRDC and IGSD support ARB's proposal to limit the GWP of home refrigerators and freezers to 150 in 2021. ARB's proposal parallels the date in EPA's recent proposal to end the use of HFC-134a in those units, but mandates a deep cut in GWP as well. Should California adopt the proposal, its less-than-150 requirement would push national manufacturers to adopt low-GWP refrigerants like isobutane rather than less-efficient, higher-GWP HFO/HFC blends still permitted by EPA in refrigerators and freezers.

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[3] *Johnson Controls Advances Environmental Sustainability with Chiller Platforms Compatible with Low GWP Refrigerants*. Johnson Controls, January 20, 2016. http://www.johnsoncontrols.com/media-center/news/press-releases/2016/01/20/advanced-environmental-sustainability-with-chiller-platforms-compatible-with-low-gwp-refrigerants

[4] *Obama Administration and Private-Sector Leaders Announce Ambitious Commitments and Robust Progress to Address Potent Greenhouse Gases*. Office of the Press Secretary, October 15, 2015. https://www.whitehouse.gov/the-press-office/2015/10/15/fact-sheet-obama-administration-and-private-sector-leaders-announce

UL Standard 250 and EPA's use restrictions on hydrocarbons need to be modified before isobutane – the ideal alternative refrigerant from perspectives of cost, energy efficiency, and noise – can be used. ARB should therefore coordinate its actions with EPA's process to ensure that its schedule is complementary.

Prohibition on the Sale of New Refrigerant with Very-High GWPs

NRDC and IGSD recommend that ARB proceed with a sales ban on very-high-GWP refrigerants, above GWP 2500. While ARB is addressing the large installed base of HCFC-22 commercial refrigeration systems that need to convert to non-ozone-depleting alternatives by limiting the GWP of new commercial systems, ARB must still address the large market segment currently using R-404A, R-507A, and other very-high-GWP refrigerants than can be serviced indefinitely with high-GWP refrigerants per SNAP regulations.

If California restricts the sale of refrigerants above GWP 2500, store owners will be likely to retrofit – or, in the case of drop-in replacements, simply begin recharging – with lower-GWP refrigerants like R-448A and R-449A, both of which have GWPs one third that of R-404A and are drop-in compatible. ARB's estimate of 5 $MMTCO_2$-eq emissions savings (over a 20-year horizon) by 2030 demonstrates the effectiveness of this proposed measure and NRDC and IGSD believe the number could be even higher.

Phasedown in Supply of HFCs

NRDC and IGSD suggest that ARB continue to develop an HFC supply phasedown. Should the parties to the Montreal Protocol fail to reach an agreement on HFCs in 2016, ARB's state-wide phasedown could set a positive example for the US and other developed countries still debating controls on HFCs.

Along the same lines, ARB should plan for an amended Montreal Protocol that includes HFCs by planning for eventual integration of its reductions target and HFC plan with the amended Protocol. The North American proposal – similar to others from the European Union, India, and a coalition of Island nations led by the Federated States of Micronesia – proposes a 70% cut in nation-wide HFC consumption and production in 2030 (from a 2011-2013 average baseline), considerably deeper than the fraction of HFC emissions California proposes to cut in that year. While consumption and emissions are indeed distinct metrics, their relationship in California warrants investigation to understand how these plans will relate.

California should also work with EPA to understand its plan to meet the national targets as proposed at the Montreal Protocol and how those measures will affect California's SLCP plan. Should ARB continues to strengthen its plan, there are some additional strategies it may consider. For example, ARB could prevent chemical speculators from stockpiling by placing a floor tax on refrigerants from the time they are banned from new equipment. Another strategy worth considering is to specify that equipment be banned from manufacture and sale in California within two years of removal from the SNAP list. Otherwise, manufacturers may be tempted to dump obsolete productions into California as they might do in many other states.

Develop a List of Products Using Low-GWP Alternatives

Leadership companies in some sectors, such as motor vehicle air conditioning and residential and commercial refrigeration, are rapidly introducing low-GWP alternatives, but it is not

easy for government procurement authorities and customers to distinguish these next-generation technologies from the obsolete HFC models. For example, the only publically available inventory of automobiles and light trucks with HFO-1234yf air conditioning (GWP<1) as an alternative to HFC-134a vehicle air conditioning (GWP=1300) is maintained by IGSD, with the disadvantage that it depends on a voluntary network of automotive authorities to update that list.

The solution is for California to curate a list of self-reporting manufacturers selling low-GWP products in on a web-based system that would automatically post the information as fast as received. This list of technology options would help consumers purchase the most climate-friendly appliances possible and would also illustrate when enough alternative products have reached the market that high-GWP products could be restricted in those classes.

This reporting could also include when the same product is available in other markets with the modern, low-GWP refrigerants but sold in California with obsolete technology. An example includes vehicles sold in Europe with HFO-1234yf air conditioning but offered in California only with HFC-134a technology.

Such an inventory would be valuable to California and also to other states and nations seeking the latest information on next-generation products designed to protect climate.

End the Promotion of HFC Products as "Environmentally Friendly"

HFCs, once necessary and desirable to replace chlorofluorocarbons (CFCs), are safe for the stratospheric ozone layer and typically have lower GWPs than the chemical substances they replaced. Thus, it was once reasonable to promote the HFC products as "ozone friendly," "eco-friendly," or "environmentally friendly." Today, however, it is false and misleading to promote high-GWP HFC products as having environmental merit. It also obscures the consumer advantages and climate benefits gained using next-generation, more-energy-efficient, lower-GWP products.

Therefore, California should require manufacturers to remove false claims of environmental acceptability of products made with high-GWP HFCs from all advertising and product literature. Because some manufacturers may choose to falsely mislabel products sold in other markets and because it will take time for falsely labeled inventory to be sold, California might consider the advantage of allowing manufacturers to conspicuously apply labels to boxes, to post notification of HFC content on display models, and to otherwise simply convey the information to consumers.

Conclusions

ARB's leadership on SLCPs advances California's climate efforts, which have become a beacon for the country and much of the world. This year, 2016, is a watershed year for controlling explosive growth in HFC use and is poised to mark the second major win for the climate in as many years. With ARB's adoption of its Proposed Reductions, California and the entire US take a firm step closer to a Montreal Protocol amendment and the 0.1°C of climate warming by 2100 that it will prevent.

Sincerely,

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