Private Governance Response to Climate Change: The Case of Refrigerants

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Refrigerants are promising targets for private greenhouse gas (GHG) emissions reduction initiatives. Air conditioning units, fire extinguishers, aerosols, and solvents all contain chemical refrigerants that absorb and release heat. Refrigerants are used to chill food, buildings, and vehicles. Among commercial buildings, office space, health care, food service, and retail sales and service comprise well over 50 percent of all buildings in the United States and contribute a comparable amount of refrigerant emissions. Air Conditioning, Heating, & Refrigeration Institute, *AHRI Releases December 2017 U.S. Heating and Cooling Equipment Shipment Data* 4 (2017). Certain refrigerants have been identified as ozone depleters, and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer was designed to reduce and eventually phase out some ozone-depleting chemicals, including chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). Although the international effort has achieved successes, the pressure to reduce CFCs and HCFCs has had the unintended consequence of generating demand alternatives such as hydrofluorocarbons (HFCs), which are potent GHGs.

HFCs are fluorinated gases that belong to a GHG category referred to as short-lived climate pollutants (SLCPs). SLCPs include methane, HFCs, black carbon, and tropospheric ozone. Especially over short time horizons, these pollutants have a strong effect on global temperatures. HFCs and methane, for example, have a much higher global warming potential (GWP) than their GHG counterparts. Some HFC blends have a GWP up to 14,800 times higher than carbon dioxide (CO_2). Comparatively, some natural refrigerants, such as ammonia, have no GWP. Further, because SLCPs exist for a short time in the atmosphere, SLCP elimination can quickly reduce global temperature rise. Katherine Ross et al., *Strengthening Nationally Determined Contributions to Catalyze Actions that Reduce Short-Lived Climate Pollutants*, World Resources Institute, Working Paper, Sept. 2018, https://wriorg.s3.amazonaws.com/s3fs-public/18_WP_SLCPs_toprint2.pdf.

HFCs are the fastest growing GHGs in much of the world and are increasing at 10 to 15 percent per year. For example, from 1990 to 2016 total CO_2 emissions increased 15.7 percent, but HFC emissions in that period increased 248.5 percent. www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf. This growth arises from replacement of CFCs with HFCs as chemical refrigerants and increased demand for air conditioning worldwide. A Lawrence Berkeley National Laboratory report projects that the world is poised to install 700 million air conditioners by 2030 and 1.6 billion by 2050, and it concludes that if the world phased out HFCs and shifted toward 30 percent more efficient air conditioners, the avoided CO_2-equivalent could be up to 98 billion tons by 2050. Nihar Shah et al., *Benefits of Leapfrogging to Superefficiency and Low Global Warming Potential Refrigerants in Room Air Conditioning* (2015).

HFC use is projected to increase as much as 20-fold by 2050, adding up to 0.1°Celsius of global average temperature rise. Recognizing this issue, in 2017 Paul Hawken's Project Drawdown ranked refrigerants as the number one GHG emissions reduction opportunity. *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming* (Paul Hawken ed., 2017). Although the Drawdown effort provided a sophisticated analysis of the contribution of refrigerants, it did not identify the feasible public or private initiatives that could exploit this opportunity. Government initiatives have targeted refrigerants at the international, national, and subnational levels, but given the limited prospects for major new government action in the near term, this article focuses on how private governance initiatives can fill the gap.

Global and Domestic HFC Regulation

Several major refrigerant efforts have occurred at the international level. In 2016, more than 170 countries agreed to the phased reduction of HFCs through the Kigali Amendment to the Montreal Protocol. Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, XXVII.2.f, Oct. 15, 2016, 56 I.L.M. 193. In the Kigali Amendment, ratifying countries committed to cutting HFC production and consumption by more than 80 percent over the next 30 years. Only 48 countries so far have ratified the amendment, though, and the United States has not done so.

At the national level, President Obama's 2013 Climate Action Plan sought to use the EPA Significant New Alternatives Policy (SNAP) program to curb HFC emissions by encouraging private sector investment in low-emissions technology. The EPA then issued a rule in 2015 that "focused on those listed substitutes that have a high [GWP] relative to other alternatives in specific end-uses." 40 C.F.R. § 82 (2015). The rule categorized "unacceptable" chemicals based on their global warming effects, rather than only listing "acceptable" chemicals based on their ozone depleting effects. The rule changed the status of many HFC uses from "acceptable"

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to "unacceptable" and effectively banned 38 HFCs or HFC blends in uses in four sectors: retail food refrigeration, air conditioning for new cars, aerosols, and foam blowing.

Mexichem Fluor and Arkema manufacture a prohibited HFC and sued the EPA following issuance of the rule. *Mexichem Fluor, Inc. v. EPA*, 866 F.3d 451, 456 (D.C. Cir. 2017). The companies alleged that the EPA exceeded its authority under Clean Air Act (CAA) section 612. They argued that the CAA authorized action on ozone depletion, not climate change, and that because HFCs are not ozone depleters the EPA did not have the authority to regulate HFCs. In 2017, the D.C. Circuit vacated the EPA rule in an opinion written by now-Justice Brett Kavanaugh, noting that "Congress's failure to enact general climate change legislation does not authorize the EPA to act." *Id.* at 460.

The increasing trend toward federal deregulation has opened gaps in the environmental regulatory framework for many pollutants in addition to HFCs, and in recent years private initiatives have begun to perform many environmental protection functions.

While the *Mexichem* case was pending in the D.C. Circuit, President Trump issued an executive order revoking the Climate Action Plan and instructing agency heads to suspend, revise, or rescind actions under the Climate Action Plan. Exec. Order No. 13,783 (Mar. 31, 2017). The administration reasserted its position on the issue when Honeywell Chemicals and the Natural Resources Defense Council sought Supreme Court review of the D.C. Circuit decision. *See* Brief for the Federal Respondent in Opposition, *Honeywell International Inc. v. Mexichem Fluor, Inc.*, No. 17-1703 (Aug. 27, 2018). In its brief, the Department of Justice noted that although EPA originally argued that it had the authority to require use of HFC substitutes, "EPA has revisited the issue in light of the court of appeals' ruling." *Id.* at 9. On October 9, 2018, the Supreme Court declined further review of the D.C. Circuit decision. *Mexichem Fluor, Inc. v. EPA*, 866 F.3d 451, 456 (D.C. Cir. 2017), *cert denied*, 2018 WL 3127416 (2018).

Further, in September 2018, EPA acting Administrator Andrew Wheeler signed a new proposed rule that targets another Obama-era HFC regulation. Originally, refrigerant leak limits only applied to ozone-depleting refrigerants, but in 2016 the Obama administration extended CAA section 608 refrigerant management guidelines to include HFCs. Section 608 regulates stationary refrigeration and air conditioning with the goal of reducing the use and emissions of CFCs and HCFCs and ensuring their safe disposal. The new requirements were designed to curtail HFC emissions by regulating allowable leakage rates, but the new proposed rule would limit the guidelines to only ozone depleters. Protection of Stratospheric Ozone: Revisions to the Refrigerant Management Program's Extension to Substitutes, Proposed Rule, 83 Fed. Reg. 49,332–344 (Oct. 1, 2018). The proposal removes leak inspection, repair, and record keeping requirements for appliances containing more than 50 pounds of HFCs.

In addition, a newly finalized EPA rule allows household appliance manufacturers to use more than double the amount of climate-friendly replacements for a common HFC refrigerant. Protection of Stratospheric Ozone: Revision to References for Refrigeration and Air Conditioning Sector to Incorporate Latest Edition of Certain Industry, Consensus-Based Standards, Final Rule, 83 Fed. Reg. 38,969 (Aug. 8, 2018). When combined with the new composition of the Supreme Court, these actions make it highly unlikely that the federal government will take advantage of the refrigerant emissions reductions opportunities identified by EPA and the Drawdown report.

Several state governments are trying to fill the gap. In March 2018, the California Air Resources Board (CARB) adopted a regulation prohibiting HFC use. CARB noted that the action was designed to "preserve and continue in California some of the [EPA's] prior prohibitions on HFCs." Initially, California relied on EPA's SNAP rules to meet California's GHG emissions reduction goals, but CARB adopted the new regulation after the D.C. Circuit opinion and EPA's change of direction. CARB, *California Acts to Limit Powerful Climate-Changing Chemicals*, (Mar. 23, 2018), https://ww2.arb.ca.gov/news/california-acts-limit-powerful-climate-changing-chemicals. Additionally, the California Cooling Act, which was signed into law in September 2018, establishes the Fluorinated Gases Emission Reduction Incentive Program to promote adoption of new refrigerant technologies. The law also requires the Public Utilities Commission and other governmental entities to develop strategies for low GWP alternatives. S. Bill No. 1013 (Cal. 2018).

Similarly, in September 2018, New York Governor Andrew Cuomo instructed the New York State Department of Environmental Conservation to phase out HFC use in new and retrofitted equipment, including residential refrigerators and air conditioning units. Maryland and Connecticut have also announced plans to act on HFCs. These state actions are significant, but states representing roughly 60 percent of United States HFC emissions are not acting, and HFC emissions have not been a focus of local governments, so the subnational level is unlikely to fill the gap in the near term.

Private Environmental Governance

What is private environmental governance? By private environmental governance (PEG), we mean initiatives taken by the private sector—businesses, civic and advocacy groups, universities, hospitals, religious organizations, and households—that perform the environmental protection functions traditionally assigned to government. *See* Michael Vandenbergh, *Private Environmental Governance*, 99 Cornell L. Rev. 129, 132 (2013). The increasing trend toward federal deregulation has opened gaps in the environmental regulatory framework for many pollutants in addition to HFCs, and in recent

years private initiatives have begun to perform many environmental protection functions. These initiatives can bypass the deep polarization and political barriers that constrain government action on climate change and other issues. *See* Michael Vandenbergh & Johnathan Gilligan, *Beyond Politics: The Private Governance Response to Climate Change* 9–10 (2017).

How widespread is PEG? PEG initiatives address many of the same issues as public environmental laws, including climate change, toxics regulation, resource management, and others. Sarah E. Light & Michael P. Vandenbergh, *Private Environmental Governance*, Decision Making in Environmental Law: Elgar Encyclopedia of Environmental Law 253–67 (LeRoy C. Paddock et al., eds., 2016). PEG initiatives also deploy many of the same types of regulatory tools, including disclosure, prescription, and market leveraging. See Sarah E. Light & Eric W. Orts, *Parallels in Public and Private Environmental Governance*, 5 Mich. J. Envtl. & Admin. L. 1, 23–52 (2015).

The role of PEG in climate mitigation is likely to grow as the international and national processes yield limited results. PEG can complement, compete with, or fill gaps in government regulation. An example of PEG complementing government action stems from the early efforts to reduce ozone depleters. In the 1970s, advocacy groups raised concerns about ozone depleting chemicals in aerosols. Retail aerosol sales declined dramatically—up to 40 percent for some companies. Consumer and retailer pressure induced manufacturers to identify substitutes, and in some cases the manufacturers found that the cost of substitutes was substantially less than the cost of aerosol-based products. For instance, one deodorant's aerosol version cost 357 percent more than the roll-on form. Seth Cagin & Philip Dray, *Between Earth and Sky* 203–06 (1993). Similarly, Nortel, a global electronics firm, discovered that it could save millions of dollars annually by eliminating CFC-113, an ozone depleting chemical, and replacing it with a more environmentally friendly compound. *See* Richard E. Benedick, *Ozone Diplomacy* 232 (1998). The early private initiatives targeting consumers and retailers thus appear to have reduced the use of ozone depleters in advance of the Montreal Protocol and to have reduced industry incentives to oppose government requirements.

In addition to filling gaps before government acts, PEG also can fill gaps when government walks away from the battlefield. For example, within hours of President Trump's Paris Agreement withdrawal announcement, many CEOs and investors joined the "We're Still In" movement. This initiative enabled them not only to voice their support for government climate initiatives, but also to commit to achieve the Paris goals even absent federal mandates. *See, e.g.*, Hiroko Tabuchi & Henry Fountain, *Bucking Trump, These Cities, States and Companies Commit to Paris Accord*, N.Y. Times (June 1, 2017), www.nytimes.com/2017/06/01/climate/american-cities-climate-standards.html.

Private Initiatives to Reduce Refrigerant Emissions

For private initiatives to fill gaps in the government regulatory regime, they must be able to motivate private organizations and households to reduce emissions even absent the coercive power and resources of government. For refrigerants, this is not as difficult as it might seem. Refrigerant replacement is expensive, so cost savings can arise from reducing releases. In addition, equipment that operates with insufficient amounts of refrigerant uses more energy, increasing costs and the GHG emissions associated with providing that energy. For example, the Canadian food retailer Sobeys found that compared to a traditional HFC refrigerant system, a natural system (in this case a CO_2-based system) enabled up to a 15 percent reduction in installation costs and electrical energy usage and up to 20 percent savings in heating gas usage. Consumer Goods Forum, *Refrigeration: Commitments and Achievements of CGF Members* 29–30 (2018).

The Sobeys example and others suggest that a gap exists between the refrigerant practices that would save firms substantial amounts of money and the actions they are taking—a "refrigerant gap" that is a part of the much-discussed efficiency gap. Steve Sorrell et al., *Barriers to Industrial Energy Efficiency: A Literature Review* 6 tbl.2.3, U.N. Indus. Dev. Org., Working Paper No. 10/2011 (2011), https://perma.cc/J7YK-EWE4. This refrigerant gap may exist because of several market failures. A first arises from inadequate information: Refrigerant leaks can be expensive for individuals and small businesses to identify, and the cost savings from reducing leaks can be difficult to quantify. A second arises from difficulties making rational decisions when cost savings are spread over many years but emissions reductions require up-front costs.

A third market failure arises when organizations separate the unit that benefits from reduced capital expenditures from the unit that benefits from reduced operating expenditures. We refer to this as the cap-ex/op-ex problem. Refrigerant leaks often increase energy expenditures, reduce equipment life, and increase material costs, all of which adversely affect operating budgets. Refrigerant leaks also adversely affect capital expenditures budgets when equipment fails, requiring more frequent equipment replacement. In addition, if refrigerants become obsolete and supplies are insufficient to sustain normal and safe operations, op-ex expenditures increase. The cap-ex/op-ex problem arises because refrigerant losses often increase operating costs in ways that not only are difficult to identify and occur over long periods, but also are not incurred by the unit that manages capital costs. For example, responsibility for cap-ex such as major equipment replacement may exist with the energy, sustainability, or finance team, but responsibility for op-ex such as equipment maintenance and HFC replacement may be made by the operations or maintenance team. As a result, equipment maintenance regarding refrigerants may be given a low priority because more frequent equipment replacement may benefit the operations team but not finance team, which has authority over equipment replacement. To address the cap-ex/op-ex problem, private initiatives could create stronger incentives for refrigerant emissions reductions. This could force top management, which has incentives to reduce net expenditures from cap-ex and op-ex, to focus on refrigerant loss. Private initiatives also could increase the focus on the total cost of ownership, which would account for the refrigerant impacts on both cap-ex and op-ex by bringing new key performance indicators into the decision-making process.

Many organizations also may be motivated by factors other than direct cost savings, such as reputation, employee morale, and others. For instance, many firms have committed to make carbon emissions reductions, and these commitments may be enforced through investor, lender, insurer, supply chain,

NGO, consumer, and employee pressure, as well as incentives to anticipate future regulation. *See* Michael Vandenbergh & Johnathan Gilligan, *Beyond Politics* 177–222 (2017). Multiple examples from the aviation, food, and other sectors suggest that when firms respond to these initiatives by identifying the carbon footprint of their operations, they often find costly inefficiencies that had existed for years. A number of potential drivers thus exist for refrigerant emissions reductions.

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A promising PEG option is to accelerate initiatives that incentivize large corporations to focus on refrigerants as a part of their efforts to fulfill existing climate commitments. For instance, the Science Based Target Initiative (SBTi), a collaboration between CDP (formally the Carbon Disclosure Project), the World Resources Institute, the World Wide Fund for Nature, and the United Nations Global Compact, focuses on climate target-setting. The initiative helps companies set targets that are consistent with the level of decarbonization required to limit global warming to less than 2° Celsius. Science Based Targets, https://sciencebasedtargets.org/ (last visited Feb.1, 2019). The retailer Target, for example, participated in the SBTi and set a goal of introducing HFC-free refrigerants in food distribution centers and stand-alone cases. By 2016, Target had 585 buildings, and all 5 food distribution centers used HFC-free refrigerants; it included 1,081 stores by 2017. For 2018 the goal was for all new stand-alone units less than 2,200 BTU/hour to use HFC-free refrigerants. Target, *2018 Target Corporate Responsibility Report* 25, 26, 45 (2018), https://corporate.target.com/_media/TargetCorp/csr/pdf/2018_corporate_responsibility_report.pdf. Target, *2018 Target Corporate Responsibility Report* 25, 26, 45 (2018).

Pressure from the general public, investors, supply chains, and corporate coalitions may motivate companies to participate in SBTi and other private initiatives. Research suggests that firms attempt to maintain their social license to operate, not just their legal license. Neil Gunningham, et al., *Social License and Environmental Protection: Why Businesses Go Beyond Compliance*, 29 Law & Soc. Inquiry 307, 308–10 (2004). An example of public pressure regarding refrigerants occurred when Greenpeace Australia helped draft environmental guidelines for the 2000 Olympic Games in Sydney. The guidelines so impressed the International Olympic Committee that they helped Sydney win the bid to host the Games, but Greenpeace, unhappy with Coke's early compliance, released a report entitled "Green Olympics, Dirty Sponsors." The report highlighted GHG refrigerant use by Coca-Cola and McDonald's, and Greenpeace launched a spoof website with the terms "Enjoy Climate Change" and "HFCoke," using the brand's recognizable calligraphy. Compliance with the guidelines improved. Along with McDonald's and Unilever, Coca-Cola made sweeping declarations regarding future use of HFCs and started "Refrigerants, Naturally!," the first corporate alliance with the goal of replacing HFC technology with natural refrigerants. *Social Partnerships and Responsible Business: A Research Handbook* 402–05 (M. May Seitanidi & Andrew Crane eds., 2013).

In addition to public pressure, investor pressure can be brought to bear on companies that are not taking advantage of even cost-beneficial refrigerant opportunities. An example involves CDP, which uses the carbon disclosure interests of investors holding more than $100 trillion worldwide to push for corporate disclosure and emissions reductions. Although CDP has a reporting element regarding HFCs, HFCs are not a major focus of CDP's efforts. This is a promising area for near-term initiatives to increase the global corporate focus on HFCs.

Corporations, universities, and other organizations could increase the reach of their HFC programs by including requirements in supply chain contracts. This could bypass international boundaries and extend the influence of these programs to smaller firms in the United States and around the world. See Michael P. Vandenbergh & Mark A. Cohen, *Climate Change Governance: Boundaries and Leakage*, 18 N.Y.U. Envtl. L.J. 221–92 (2010). Supply chains are a CDP priority area, and in 2017 its supply chain program collected data from over 4,800 companies. CDP, *Closing the Gap: Scaling Up Sustainable Supply Chains* 6 (2018). Reporting protocols used by the CDP and the Global Reporting Initiative (GRI) could make a major dent in U.S. and global refrigerant emissions if specific, clearly identifiable metrics were included for calculating and reporting HFC emissions. In addition, increased participation could be induced through NGO-led naming and shaming campaigns that target HFC reporting.

Professional sports teams present another opportunity. Many teams have committed to climate mitigation efforts, and 15 professional North American stadiums or arenas have achieved LEED certifications. Further, 38 teams have shifted to renewable energy for some of their operations and 68 teams have energy efficiency programs. NRDC Report, *Game Changer: How the Sports Industry is Saving the Environment* 8 (2012). In addition, the National Hockey League (NHL) partnered with The Chemours Company to provide sustainable refrigerants to ice rinks. Press Release, NHL Public Relations, NHL Announces Partnership Providing Sustainable Solutions to Rinks (May 22, 2018), www.nhl.com/news/nhl-announces-partnership-providing-sustainable-solutions-to-rinks/c-298719948. Many rinks across America currently use HCFC-22, which is being phased out, or they use HFCs. The NHL is seeking to phase down HFC use in compliance with the Kigali Amendment despite the United States not being party, and other sports leagues could be induced to follow suit.

The commitment of the NHL and other organizations to maintain compliance with the Kigali Amendment suggests that an opportunity may exist for a private initiative to encourage mitigation efforts through an NGO-company collaborative based on a "We Will Still Comply" concept, drawing on the successful "We Are Still In" movement. In this initiative, companies would pledge to continue compliance with or without federal incentive. California, New York, and other

states could support this effort, and it could provide a more uniform playing field for refrigerant manufacturers and users. An example of what this might look like is the Consumer Goods Forum (CGF), an organization that brings consumer goods retailers and manufacturers together to collaborate on environmental initiatives, including refrigerant management. The organization adopted a Refrigeration Resolution in 2010, then published a Refrigeration Booklet showcasing examples of natural and low-carbon refrigeration systems. CGF encourages reporting regarding natural refrigerants, and since 2010 members have replaced systems in over four thousand supermarkets and four million ice cream and drinks chiller units worldwide. The Consumer Goods Forum, *Refrigeration: Phasing Out Harmful HFCs*, www.theconsumergoodsforum.com/initiatives/environmental-sustainability/key-projects/refrigeration/ (last visited Feb. 1, 2019).

Providing a more feasible way for companies to track and report sustainability efforts may enable companies to incorporate these issues into operational or tactical decision-making at the maintenance level and may facilitate investor pressure for GHG reductions. Two key reporting organizations, GRI and the Sustainability Accounting Standards Board, are attempting to bring their standards into alignment. This could enhance efforts to bring sustainability reporting into the financial mainstream, Liz Enochs, *SASB and GRI Step Up Project to Align Reporting Standards*, GreenBiz (Sept. 20, 2018), and if these efforts increase the focus on GHG emissions, they also may create incentives for firms to reduce refrigerant emissions.

PEG initiatives also could focus on other private sector actors such as universities, hospitals, religious organizations, and households. For instance, equipment that uses refrigerants accounts for 30 to 40 percent of the energy costs of the average research university, but many have not invested even in cost-effective refrigerant management systems. From a refrigerant management perspective, universities resemble a small city with multiple vintages of buildings and equipment. Pressure for new buildings can leave older assets stranded and a victim of deferred maintenance, and these organizations confront many of the same cap-ex/op-ex problems as corporations. Climate-focused initiatives that harness universities' interest in cost reductions and reputation with prospective applicants, students, faculty, staff, and donors may be needed to overcome the barriers to efficient refrigerant management.

Reporting standards may play a particularly important role in reducing university refrigerant emissions. Nonprofit organizations that generate university green rankings could stimulate interest in refrigerant emissions by increasing the priority of refrigerants in their assessments. Efforts to induce universities to adopt ISO 14064 could encourage them to better understand and report emissions. This also could increase knowledge about the number of systems that use refrigerants, the refrigerants used, and leak rates. Universities that already have strong refrigerant management programs could be induced to destroy rather than recycle HFCs and to refrain from reselling leaky equipment that will lead to emissions from the next user. New protocols may be needed to enable universities to generate offsets from HFC replacement and destruction, rather than just leak detection, and to take credit for the results in carbon footprint calculations. Wendy B. Jacobs, Harvard Law School Emmett Environmental Law & Policy Clinic, The Climate Solutions Living Lab, Draft Memorandum, Removal and Destruction of Chemicals Used in Cooling Systems (Dec. 2018). Similarly, new financial reporting mechanisms could increase incentives for efficient refrigerant management. For instance, the Sustainable Endowments Institute promotes "green revolving funds," which reinvest the savings from energy efficiency gains. If targeted toward refrigerants, these revolving funds could address the timing and cap-ex/op-ex problems discussed above.

Similarly, refrigerant-using equipment is responsible for 20 to 30 percent of the average U.S. hospital's energy costs. The health care system is under cost pressure, but hospital managers confront the cap-ex/op-ex problem, as well as risk aversion arising from the need for constant and unconditional operation. This leaves large savings on the table. Private initiatives to address the hospital refrigerant gap could include ISO 14064 adoption, which could reduce risks from generation of wastes such as biohazards, identify refrigerant emissions reduction opportunities, and provide insurers with an indication of hospital efficiency. Donors could also use this information to ensure they are investing in strong environmental performers with efficient operations.

Private initiatives also could focus on households. Actions under individuals' substantial direct control generate roughly a third of U.S. GHG emissions, Michael P. Vandenbergh & Anne C. Steinemann, *The Carbon-Neutral Individual*, 82 N.Y.U. L. Rev. 1673, 1695 (2007), and research demonstrates that viable, nonintrusive actions could reduce household GHG emissions by 20 percent or more within a decade. Thomas Dietz et. al, *Household Actions Can Provide a Behavioral Wedge to Rapidly Reduce U.S. Carbon Emissions*, 106 Proc. Nat'l Acad. Sci. 18452, 18452 (2009). To date, only limited policy initiatives have focused on reducing household sector HFC emissions.

Households have limited information on HFCs, but an existing or new organization could certify heating, ventilation, and air conditioning (HVAC) companies based on refrigerant practices. The certifications could enable consumers to account for refrigerant emissions in their decision-making about equipment purchases and repairs. HVAC companies could receive a rating that takes into consideration training, refrigerant types and volumes, leakage, or other metrics. Similarly, LEED certification for single- and multiunit dwellings could place a greater focus on refrigerants. LEED, *Achieve Better Buildings with LEED*, https://new.usgbc.org/leed (last visited Feb. 1, 2019).

Although government action is unlikely to yield adequate refrigerant emissions reductions in the near term, many private initiatives are under way, and others can be developed to help fill the gap. These initiatives are possible because corporations, other private sector organizations, and households have economic and social motivations to reduce refrigerant emissions. The question now is whether philanthropists, advocacy groups, corporations, and others will seize the opportunity to use private initiatives to make a major dent in global refrigerant emissions.