SNAP targeted HFC and HFC sources:

1. Residential and light commercial air conditioning (RLCAC)

* Have a lifespan of 15 years
* 22% of US HFC emissions are from these Residential and light commercial air conditioning systems:
  + Room ACs have 1 lb of refrigerant
  + Packaged Terminal AC /Heat Pumps have 2 lbs of refrigerant
  + Other Residential AC (large) and Heat Pumps 10 lbs of refrigerant
  + Other Commercial AC have 15-50 lbs of refrigerant
* The HFC used in RLCAC is primarily R-410A (GWP of 2088).

1. Passenger Vehicle ACs (PVAC)

* Lifespans vary
* 40.9 MMTCO2e or 25% of total annual HFC emissions
* HFC-134a (or R-134a) is primarily used in PVACs, and has a GWP of 1430. It is also the second most abundant HFC in the atmosphere, with an atmospheric lifespan of 13.8 yrs
  + Used in cars built after 1996
* HFO-1234yf refrigerant emerged on the U.S. market in 2013, has a GWP of 4

1. Commercial Refrigeration

* 25% of total annual HFC emissions
* Stand-Alone/Self-Contained Refrigeration Systems
  + Small refrigerant charge sizes (typically 0.5 – 6.5 lbs.)
  + most often contain HFC-134a (GWP 1430) or R-404A (3922)
* Condensing Units Systems
  + Consist of one or two compressors, one condenser, and one receiver assembled into a modular system; linked to one or more display case(s) or a cold room in the sales area through a piping network; commonly used in convenience store
  + Ranges 1-45 lbs
  + HFC-134a or R-404A
* Multiplex Rack Systems
  + linked to multiple display cases in the sales area through a refrigerant piping network; common in supermarkets
  + 650 – 4,000 lbs. depending on supermarket size and system design;
  + most often contain R-404A, R-507A (GWP 3985), and R-407A (GWP 2107), although many systems containing ozone-depleting HCFC-22 (GWP 1810) still remain in use

1. Domestic Refrigeration

* In 2015, an estimated 164 million domestic refrigerators and freezers were in operation in the US.
* 0.1–0.6 lbs. of refrigerant and ~2 lbs. of blowing agent for the insulating foam.
* 2% of U.S. HFC emissions
* HFC-134a refrigerant and to HCFC-141b (GWP 725) foam-blowing agent in the mid-1990s, the latter of which has more recently been replaced by HFC-134a, HFC-245fa (GWP 1030).

1. Aerosols (consumer and Technical)

* 4.1% of US HFC emissions
* Aerosols use liquefied or compressed gas to propel active ingredients in liquid, paste, or powder form in precise spray patterns with controlled droplet sizes and amounts.
* HFC-134a, HFC-227ea (GWP 3220), HFC-43-10mee (GWP 1640), HFC-365mfc (GWP 794), HFC-245fa
* In 2015, U.S. emissions of HFCs from aerosols were estimated at 11.0 million metric tons of carbon dioxide equivalent (MMTCO2Eq)
  + 63% of this amount was from the consumer and technical uses.
* Consumer Aerosols:
  + Tire inflators/sealants; safety signal horns; animal repellents; personal care products; food dispensing products; medical aerosols; freeze sprays; spray paint; novelty aerosols; miscellaneous consumer aerosols (cleaning products, keyboard dusters, room fresheners, spray adhesives, etc)
* Technical Aerosols:
  + Dusters, cleaners, pesticides, miscellaneous technical aerosols (document preservation sprays, freeze sprays)

**Climate change in CT. Goal of emission reduction.**

Connecticut has already begun to experience the consequences of climate change. Connecticut is highly vulnerable to changes in climate due to regional characteristics including a dense population and aging infrastructure. Given the demonstrated impacts of climate change on the citizens of Connecticut and across the nation, Connecticut and other states have taken action to significantly reduce GHG emissions at a local and regional scale.

**In order to meet Connecticut’s greenhouse gas (GHG) reduction targets under XX, an effort has been made to address hydrofluorocarbons (HFCs).** HFCs are short-lived climate pollutants, but the impact, or global warming potential (GWP), of HFCs in the atmosphere is hundreds to thousands of times greater than that of an equivalent mass of CO2. They are also the fastest growing source of emissions in the U.S. and globally (CITE).  Reducing HFCs in the near-term will provide immediate and significant climate benefits while other Connecticut policies to reduce longer-lived GHGs, such as CO2, are implemented.

**Since 2005, HFC emissions have risen more than 45% in the US (CITE).** HFCs were introduced into the market as a replacement to ozone depleting substances (ODS), which were used primarily in refrigeration and air conditioning applications. The phase out of ODS under the Montreal Protocol (CITE) has been successful, but the resulting rise in HFCs and other fluorinated gases is problematic. The Kigali Amendment (CITE) was intended to address this issue with phase outs starting in 2019, and many states are looking to further reduce use of these super pollutants. However, HFCs are still used in many industrial, commercial, and residential refrigeration and air conditioning units, as well as in industrial foams, solvents, and propellants in the U.S. Collection, disposal and/or replacement of HFCs will require additional investment and research.

**As part of a GHG reduction strategy, Connecticut could have relied on the federal Significant New Alternatives Policy (SNAP) Program prohibitions on high-GWP HFCs.** When it finalized its HFC rules in 2015, EPA estimated that the rules would avoid 26 to 31 million metric tons of greenhouse gases emissions in the U.S. annually by 2020 (CITE). However, in August 2017, the D.C. Circuit Court of Appeals published a decision limiting U.S. EPA’s ability to require replacement of HFCs under the SNAP Program. Following a lawsuit by manufacturers of HFCs against the EPA over the proposed rules, the D.C. Circuit Court affirmed EPA’s legal authority to prohibit the use of HFCs as replacements for ozone-depleting substances, except as to some manufacturers. But in April 2018, EPA Administrator Scott Pruitt issued “guidance” that effectively rescinded the 2015 rules in their entirety\*.

\*As of November 2018, SNAP rule 20 has been “partially” dismissed. SNAP rule 21 is still in effect, but under litigation

**As a result, Connecticut, as well as other states, hopes to preserve key SNAP prohibitions with regards to HFCs despite lack of federal regulation.** Other states that have done or are going through similar procedures to limit HFCs, are New York, Delaware, and Maryland, with California well on their way to policy implementation by 2023. Other countries/regions like Canada and the European Union have already adopted F-gas regulation and HFC prohibitions as part of the Kigali Amendment, with other countries likely to follow suit.

**Beyond individual states, the U.S. Climate Alliance has issued a commitment to reduction of short-lived climate pollutants (SLCPs), which includes HFCs.** The U.S. Climate Alliance is a bipartisan coalition of 17 governors committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. The alliance said that strategies to reduce HFC emissions ‘promote more energy efficient systems that lower costs for businesses and households, support the leadership of US businesses developing alternatives to HFCs, and increase the need for skilled technicians and system designers.’ To compete on the global market

It can be argued that once California, New York, Maryland, Delaware, and Connecticut implement HFC regulation, other states in the alliance can be sure to follow.

Following what California has done in rulemaking for HFC reduction, notably SB 1013 (the “California Cooling Act”), Connecticut will also pursue adopting SNAP rules 20 and 21, with phase out dates being dependent on Connecticut specific needs.

Rule 20:

Under this rule, various HFCs and HFC-containing blends that were previously listed as acceptable alternatives under the SNAP program are now listed as unacceptable for specific uses. This rule is part of the SNAP program’s continuous review of alternatives to find those that pose less overall risk to human health and the environment. Specifically, this action changes the listing status for certain HFCs in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors. This action also changes the status from acceptable to unacceptable for certain hydrochlorofluorocarbons (HCFCs) being phased out of production under the Montreal Protocol on Substances that Deplete the Ozone Layer and section 605(a) of the Clean Air Act, where substitutes are available that pose overall lower risk to human health and/or the environment.

Rule 21:

Under this rule SNAP expands the list of acceptable substitutes; lists unacceptable substitutes; and changes the status of a number of substitutes that were previously listed as acceptable, based on information showing that other substitutes are available for the same uses that pose lower risk overall to human health and/or the environment. Specifically, this rule lists as acceptable, subject to use conditions, a number of substances in the refrigeration and air conditioning, and fire suppression sectors; lists several substances as unacceptable in specific end-uses in the refrigeration and air conditioning sector; and changes the listing status for certain substances that were previously listed as acceptable in the refrigeration air conditioning and foam blowing sectors. EPA is also applying the existing listing decisions for foam blowing agents to closed cell foam products and products containing closed cell foam; and listing propane as acceptable, subject to use conditions, as a refrigerant in certain new equipment and exempting it in these end-uses from the venting prohibition under CAA section 608(c)(2). Finally, this rule clarifies the listing for Powdered Aerosol D, a fire suppression agent.

CARB presentation:

<https://www.youtube.com/watch?v=8v4BJ3s_0Fg&feature=youtu.be>

stopped around minute 27