

Domestic Approaches to Address High-GWP HFCs

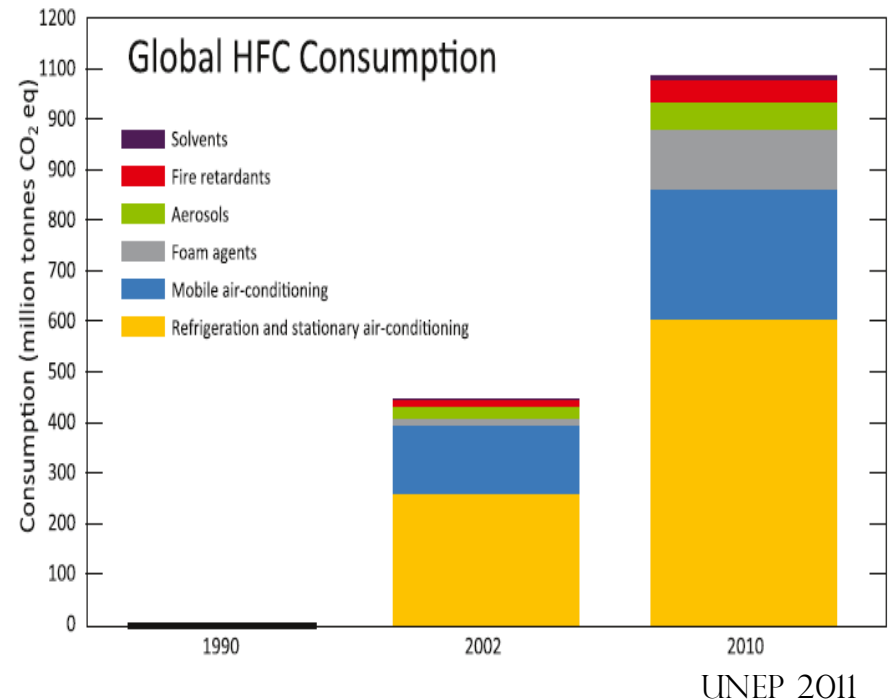
June 2015
Atlanta, GA

Gerald Wozniak
Environmental Engineer
Office of Atmospheric Programs
U.S. Environmental Protection Agency



Why are HFCs a Concern?

- HFCs ARE SYNTHETIC, FLUORINATED GREENHOUSE GASES (GHGS)
- USE AND EMISSIONS OF HFCs ARE GROWING RAPIDLY, BECAUSE THEY ARE REPLACEMENTS FOR OZONE-DEPLETING
- GLOBALLY, 2004 TO 2008 EMISSIONS INCREASED BY 18% PER YEAR; LEFT UNCHECKED, EMISSIONS COULD RISE TO NEARLY 20% OF TOTAL CARBON DIOXIDE EMISSIONS BY 2050
- IN THE UNITED STATES, HFC EMISSIONS ARE EXPECTED TO DOUBLE



President's Climate Action Plan: Action on HFCs

- **ADDRESS HFCs DOMESTICALLY:**
 - USE ***SIGNIFICANT NEW ALTERNATIVES POLICY (SNAP) PROGRAM*** TO APPROVE CLIMATE-FRIENDLY CHEMICALS AND PROHIBIT SOME USES OF MOST HARMFUL
 - PROVIDE ***FEDERAL LEADERSHIP BY PURCHASING*** CLEANER ALTERNATIVES TO HFCs WHENEVER FEASIBLE AND TRANSITION TO EQUIPMENT USING SAFE, MORE SUSTAINABLE ALTERNATIVES
- **CONTINUE INTERNATIONAL D**
ON HFCs
 - MONTREAL PROTOCOL





SNAP Program

SIGNIFICANT • NEW • ALTERNATIVES • POLICY

EVALUATES ALTERNATIVES AND LISTS ALTERNATIVES AS

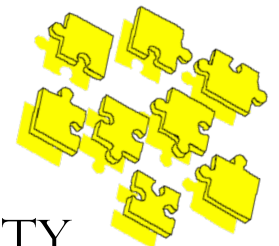
- **ACCEPTABLE** - THOSE THAT REDUCE OVERALL RISK TO HUMAN HEALTH & ENVIRONMENT
- **ACCEPTABLE WITH USE CONDITIONS** - IF NEEDED TO ENSURE SAFE USE
- **UNACCEPTABLE**

SECTORS INCLUDE:

- AEROSOLS, FOAMS, REFRIGERATION AND A/C, SOLVENTS, FIRE SUPPRESSION, ADHESIVES, COATINGS, INKS, ETC

CONSIDERS:

- OZONE-DEPLETING POTENTIAL
- GLOBAL WARMING POTENTIAL
- FLAMMABILITY
- TOXICITY
- LOCAL AIR QUALITY
- ECOSYSTEM EFFECTS
- OCCUPATIONAL & CONSUMER HEALTH/SAFETY



SNAP Action Update

- ISSUED NEW ACCEPTABILITY NOTICE ***ADDING MORE*** ALTERNATIVES
 - PUBLISHED OCTOBER 21, 2014
- ISSUED NEW RULE ADDING FIVE LOW GWP FLAMMABLE REFRIGERANTS WITH USE CONDITIONS THAT ADOPT SAFETY STANDARDS
 - PUBLISHED APRIL 10, 2015
- PROPOSED STATUS CHANGE RULE TO LIMIT USE OF HFCS
 - PROPOSAL PUBLISHED AUGUST 6, 2014

October 2014: SNAP Adds Alternatives

- EPA ACTION ADDS ADDITIONAL CLIMATE-FRIENDLY OPTIONS: HFOS; HFC/HFO BLENDS, NON-FLUORINATED SUBSTANCES

1233ZD(E) HEAT TRANSFER & FLEXIBLE PU FOAMS

- GWP <7 COMPARED TO ALTERNATIVES: 1070-4000

CO₂ FOR REFRIGERATED TRANSPORT

- GWP: 1 COMPARED TO ALTERNATIVES: ~1400-4000

R-450A (HFC/HFO BLEND) FOR REFAC

- GWP: 601 COMPARED TO HFC-134A: 1430
- E.G., RETAIL FOOD, COLD STORAGE, WATER COOLERS, ICE MACHINES
- GWP <3 COMPARED TO ALTERNATIVES: 725-143

METHYLAL FOR FOAM BLOWING END-USES

- E.G., APPLIANCE FOAM, INTEGRAL SKIN PU FOAMS
- GWP <7 COMPARED TO HFC ALTERNATIVES: 725-1430

HFO-1336MZZ(Z) FOR FOAM BLOWING END-USES

- E.G., APPLIANCE, COMM. REFRIGERATION, INTEGRAL SKIN PU FOAMS
- GWP <25 COMPARED TO ALTERNATIVES: 0-3500

POWDERED AEROSOL D FOR FIRE SUPPRESSION

- AIRCRAFT, MARINE VESSELS (NORMALLY OCCUPIED, UNOCCUPIED)

April 2015: Low-GWP Refrigerants Rule

- SNAP ADDED NEW CLIMATE-FRIENDLY OPTIONS
 - THESE ARE FLAMMABLE REFRIGERANTS
 - REQUIRED USE CONDITIONS THAT ADOPT SAFETY

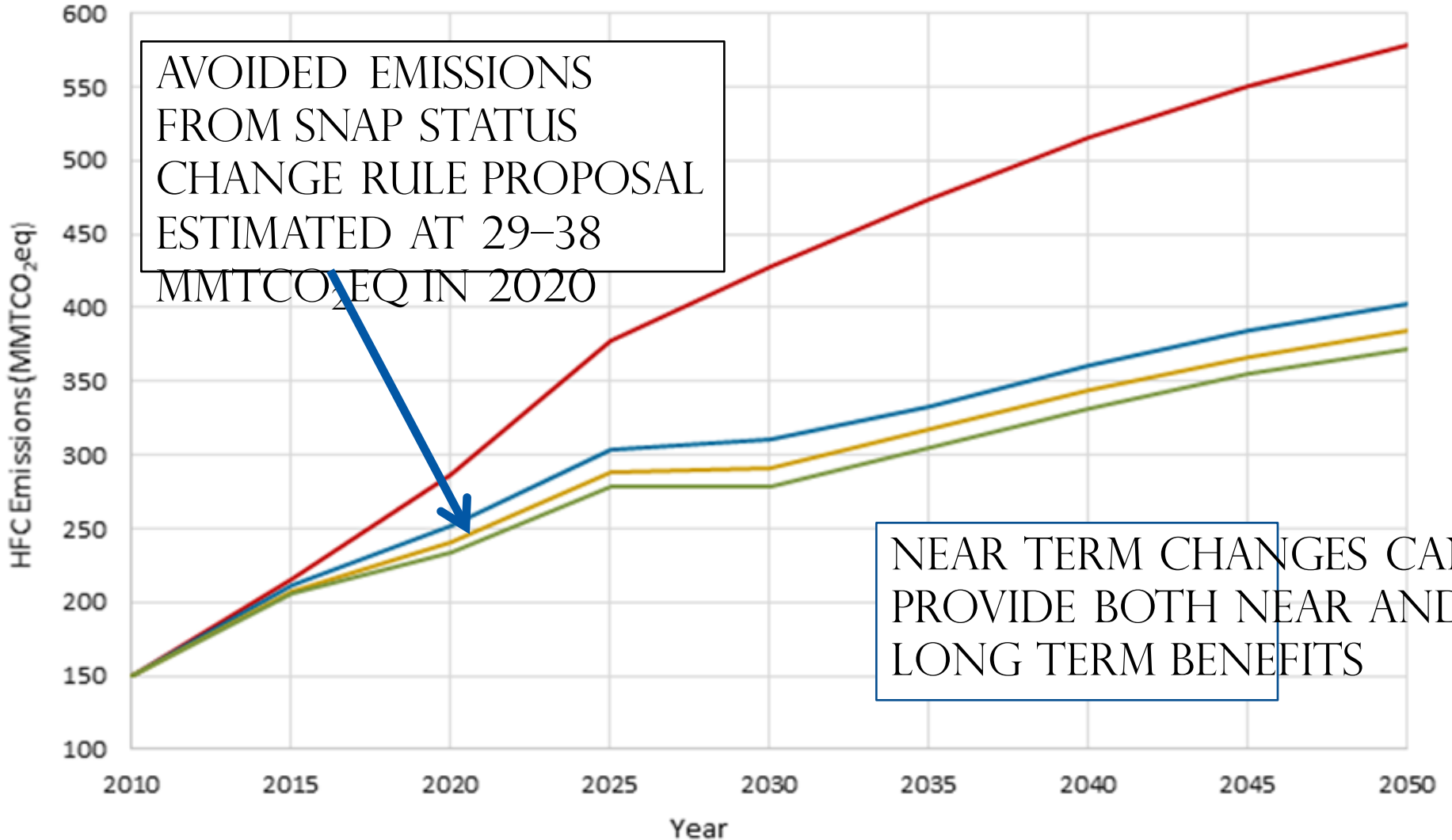
REFRIGERANT	GWP	END USE AND APPLICATION					
		HOUSEHOLD REFRIGERATORS OR RETAIL REFRIGERATORS OR STAND-ALONE	VENDING	VERY LOW TEMP REF	HEAT TRANSFER	HOME AC-SELF-CONTAINED	
ETHANE	6			✓	✓		
ISOBUTANE	8		✓	✓			
PROPANE	3	✓		✓		✓	
R-441A (HC BLEND)	<5		✓	✓		✓	
HFC-32	675					✓	

August 2014: Status Change Proposed Rule

CHANGE OF STATUS RULE: END-USE/ PROPOSED DATE	PROPOSED CHANGE
AEROSOLS <i>JANUARY 2016</i>	<ul style="list-style-type: none"> • HFC-134A UNACCEPTABLE EXCEPT FOR SOME TECHNICAL AND MEDICAL AEROSOLS INCLUDING MDIS • HFC-125, -227EA (EXCEPT MDIS) UNACCEPTABLE
MOTOR VEHICLE A/C <i>MODEL YEAR 2021</i>	<ul style="list-style-type: none"> • HFC-134A UNACCEPTABLE
FOAMS <i>JANUARY 2017</i>	<ul style="list-style-type: none"> • HFC-134A AND BLENDS THEREOF UNACCEPTABLE • HFC-245FA AND HFC-365MFC AND HFC BLENDS UNACCEPTABLE IN ALL FOAM BLOWING END-USES EXCEPT FOR SPRAY FOAM APPLICATIONS
SUPERMARKET SYSTEMS: REMOTE CONDENSING UNITS, NEW (& RETROFITS FROM ODS) <i>JANUARY 2016</i>	<ul style="list-style-type: none"> • CERTAIN HFCS UNACCEPTABLE: • HFC-227EA, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, AND R-507A
STAND-ALONE RETAIL FOOD REFRIGERATION, VENDING MACHINES: NEW <i>JANUARY 2016</i>	<ul style="list-style-type: none"> • CERTAIN HFCS UNACCEPTABLE: • HFC-134A, R-404A, R-407A, R-407C, R-507A, OTHER BLENDS
STAND-ALONE RETAIL FOOD REFRIGERATION, VENDING	

HFC Emissions Reductions

(29–38 MMTCO₂eq in 2020)



AVOIDED EMISSIONS FROM SNAP STATUS CHANGE RULE PROPOSAL ESTIMATED AT 29–38 MMTCO₂EQ IN 2020

NEAR TERM CHANGES CAN PROVIDE BOTH NEAR AND LONG TERM BENEFITS

- Emissions Baseline (BAU)
- Lower Transition Scenario
- Most Likely Transition Scenario
- Higher Transition Scenario

SNAP Next Steps

- DEVELOP FINAL STATUS CHANGE RULE
 - PUBLIC COMMENT PERIOD CLOSED OCTOBER 2014
 - REVIEWED COMMENTS (OVER 7,500) AND DEVELOPED A DRAFT FINAL RULE
 - TODAY: DRAFT WITH OFFICE OF MANAGEMENT AND BUDGET FOR INTERAGENCY REVIEW
- SNAP IS A CONTINUING REVIEW PROGRAM; CURRENT RULES SHOULD BE SEEN AS PART OF A SERIES
 - ADDITIONAL ALTERNATIVES UNDER EVALUATION; EXPECT MORE NOTICES,

Amending the Montreal Protocol

- FOUR AMENDMENTS SUBMITTED TO PHASE DOWN HFCS
 - UNITED STATES, CANADA, MEXICO
 - INDIA
 - ISLAND STATES
 - EUROPEAN UNION
- WHILE THERE ARE DIFFERENCES BETWEEN PROPOSALS, ALL SEEK TO USE MONTREAL PROTOCOL BECAUSE:
 - HFCS USED IN SAME SECTORS ODS WERE USED
 - HFCS ARE ALTERNATIVES TO HCFCs BEING PHASED OUT NOW
 - MP HAS PROVEN TECHNICAL BODIES

CAA Section 608 Regulatory Changes

- EPA announced plans to update 608 regulations in November 2014 considering these goals:
 - Reduce emissions of high-GWP refrigerants by expanding 608 to HFCs
 - Simplify, clarify, improve existing requirements
- Since then, EPA has engaged with stakeholders on needed changes, heard many great ideas and is now drafting the proposal

Next Steps

- Proposed rule in late 2015
- Final rule in 2016 after considering public comment

Additional Efforts

- PARTNERSHIP PROGRAMS
 - GREENCHILL
 - RAD
 - FEDERAL PROCUREMENT

Thank You!