

# Refrigerants Update

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Hilton  
Minneapolis, MN  
September 19-22, 2010

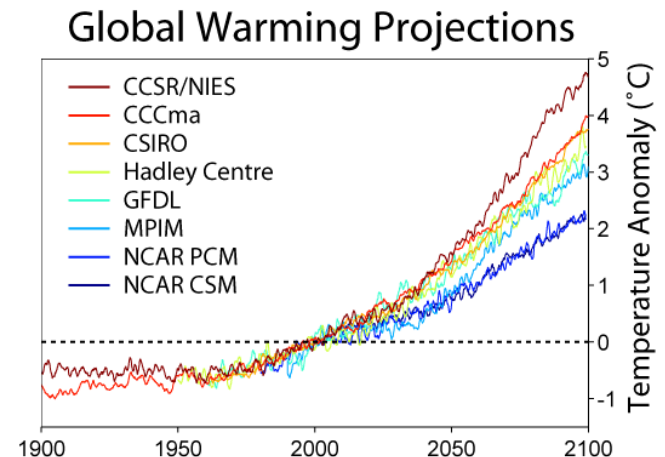
E+sd<sup>2010</sup>

Energy & Store Development Conference

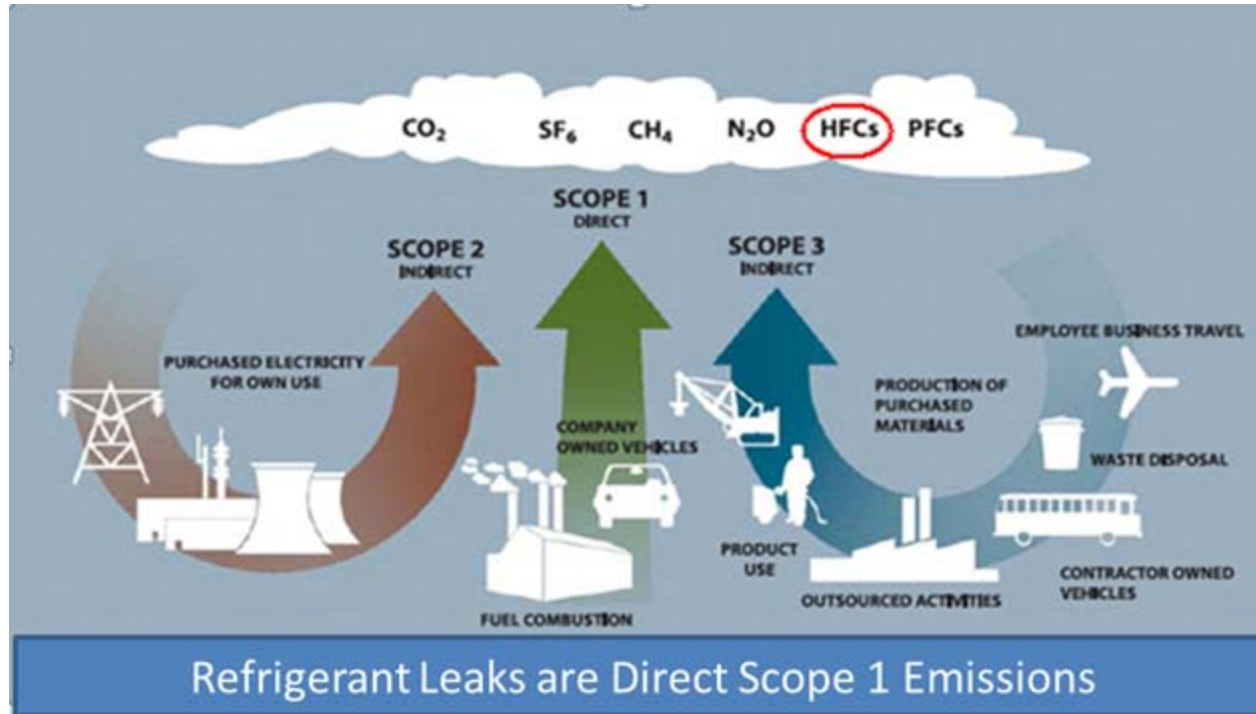


# Global Climate Change - Crash Course

- Theory that CO<sub>2</sub>, HFCs and other gasses introduced into the atmosphere through industrialization is causing irreparable harm
  - UN-IPCC projects a 2° to 11° increase the century
    - Melting ice will displace many
    - Famines and general desolation
    - Huge costs



# HFCs & Carbon Footprint

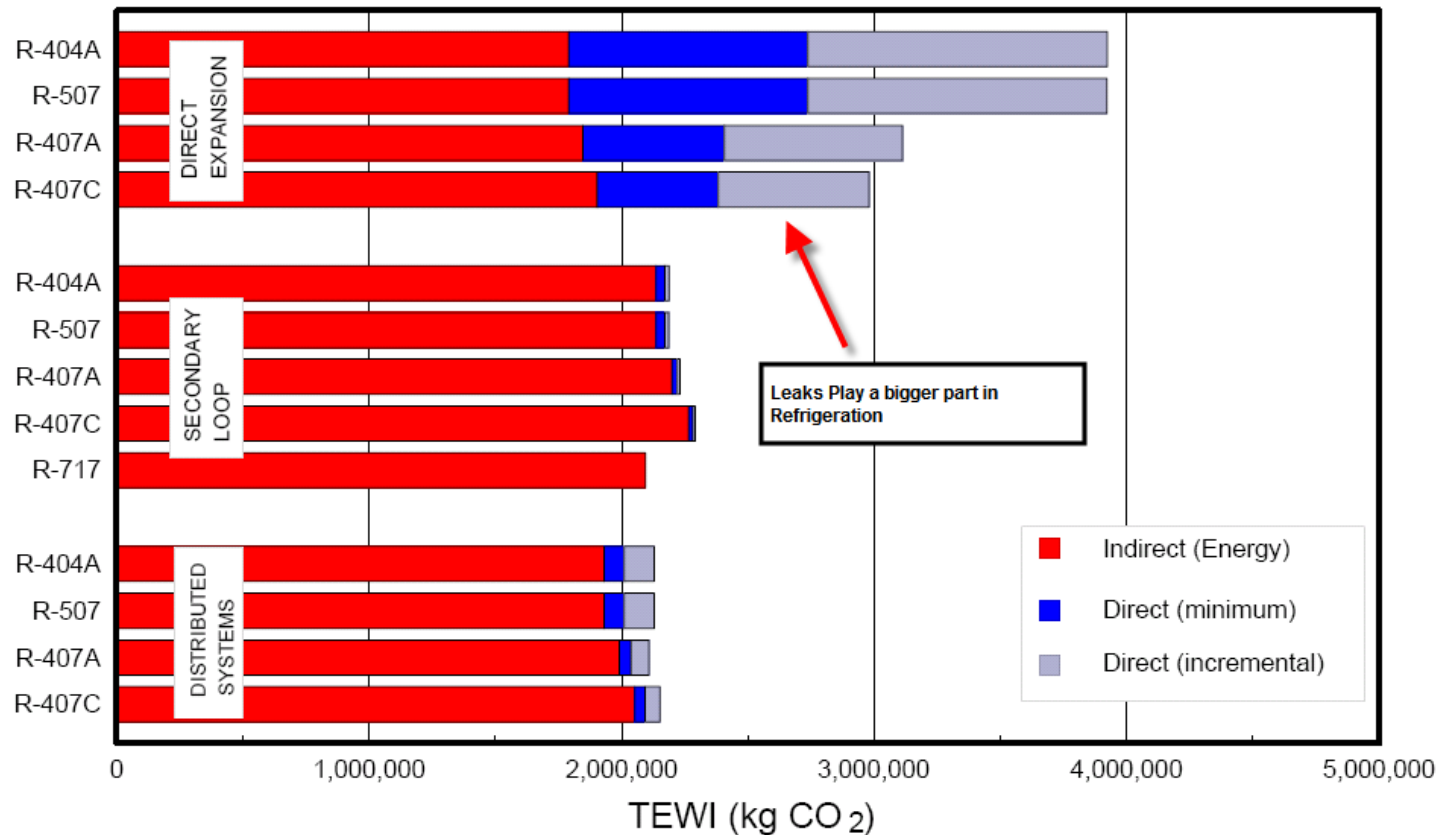


= 28



One 100 pound cylinder of R-404A leaked to atmosphere equates to the tailpipe emissions of 28 - 4x4 Chevy Suburban's travelling 12,000 miles each!

# TEWI - Refrigeration

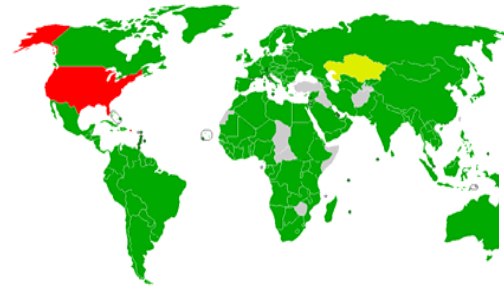


**Figure 44.** Low temperature refrigeration in North America.

Source <http://www.afeas.org/tewi/tewi-iii.pdf>

# Kyoto Protocol

- International treaty to reduce total GHGs in developed nations to 1995 levels by 2012
- Industrialized nations cut emissions, Lesser Developed Nations including China & India don't have cap
- Created the Clean Development Mechanism (CDM) as cap & trade
- Phase I ended 12/31/2007
  - Set up carbon markets
  - Established emissions goals
- Phase II 2008-2012
  - Cap reductions begun
- Post 2012 ?



# American Clean Energy & Security Act of 2009

- Aggressive bill introduced in 111th United States Congress
- June 26, 2009- Passed House by a vote of **219-212**
- No Vote planned in Senate Scheduled (likely dead for 111<sup>th</sup> Congress)

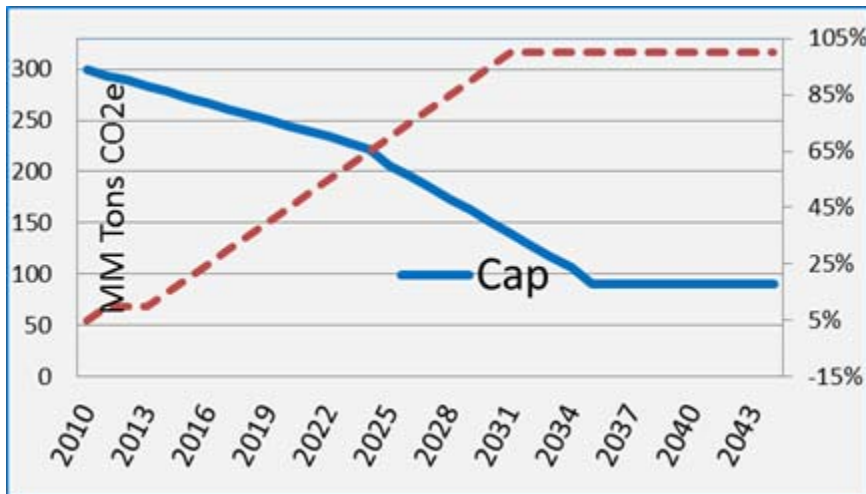
Year	Reduction
2012	3.0
2020	17.0
2030	42.0
2050	83.0

Based on 2005 total emissions

Furthest any climate related bill  
has progressed

# American Clean Energy & Security Act of 2009 Regarding HFCs

- HFCs carved out for separate cap & trade for importers, exporters & producers
  - Rights initially allocated to producers & importers of record in 2006
- provisions for \$1/MT “buy in” **For Example:**  
**R404A = \$1.78, R-407A = \$0.97**



IPCC-4 global warming values

# US- Climate Change Legislation

- EPA Endangerment Finding
  - CO2 and other high GWP gasses found to be hazardous to the health and welfare of humans
    - Authorizes the use of the Clean Air Act (CAA) to manage pollutants
      - Not ideal
- 2 New Rules
  - Lite Duty Motor Vehicle Rule
  - Tailoring Rule





# Backlash

- Failure to come to consensus on a post Kyoto agreement scuttles COP 15
  - **Non-binding** Copenhagen accord is result
- California Prop 23 - Ballot initiative freezes AB32 until unemployment rate <5.5% for 4 consecutive Qs.
  - California's ~12%
- August 2010- **U.S. Chamber of Commerce Sues EPA** Over Greenhouse Gas 'Endangerment' Decision
- House of Representatives expected to shift to the right in mid-term elections

Source CQ Politics  
September 2, 2010

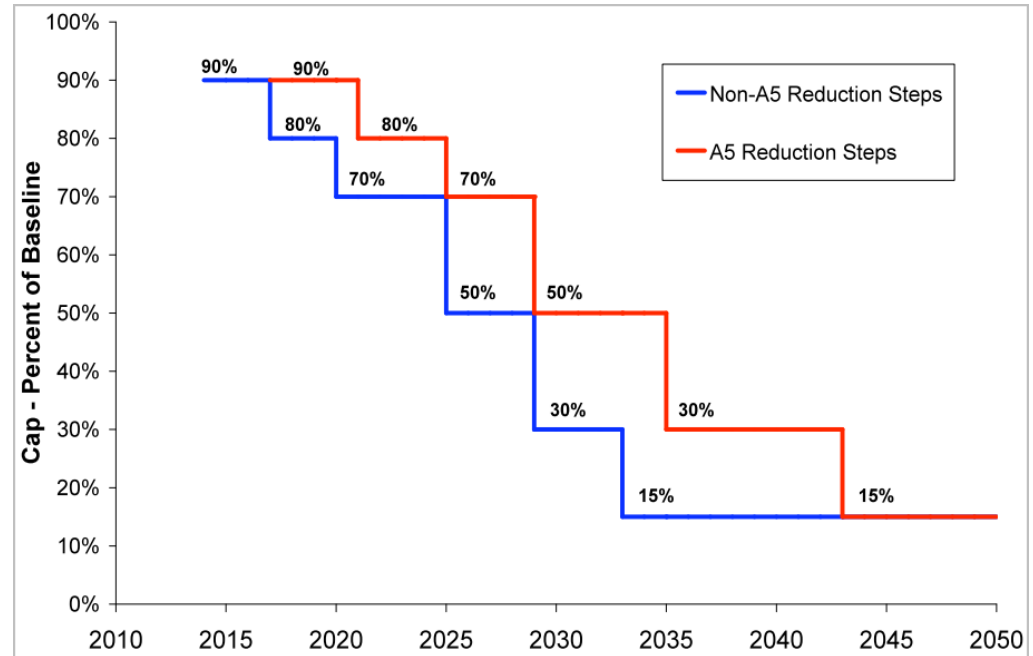
Balance of Power Scorecard						
	111th CONG.*	SAFE	LIKELY	LEANS	PROJ.	PROJECTED GAINS*
DEMS	255	169	20	30	219	2
GOP	178	168	7	5	180	4
TOSS UP					36	

# Large Companies Must Report 2010 GHG Emissions

- H.R. 2764- Passed in 2008 - Required EPA to issue **mandatory reporting of greenhouse gas emissions**
  - October 30, 2009 under Docket ID No. EPA-HQ-OAR-2008-0508-2278. Part 98
  - Became effective 12/29/2009
  - Affects 10,000 largest emitters
  - 25,000MT Threshold

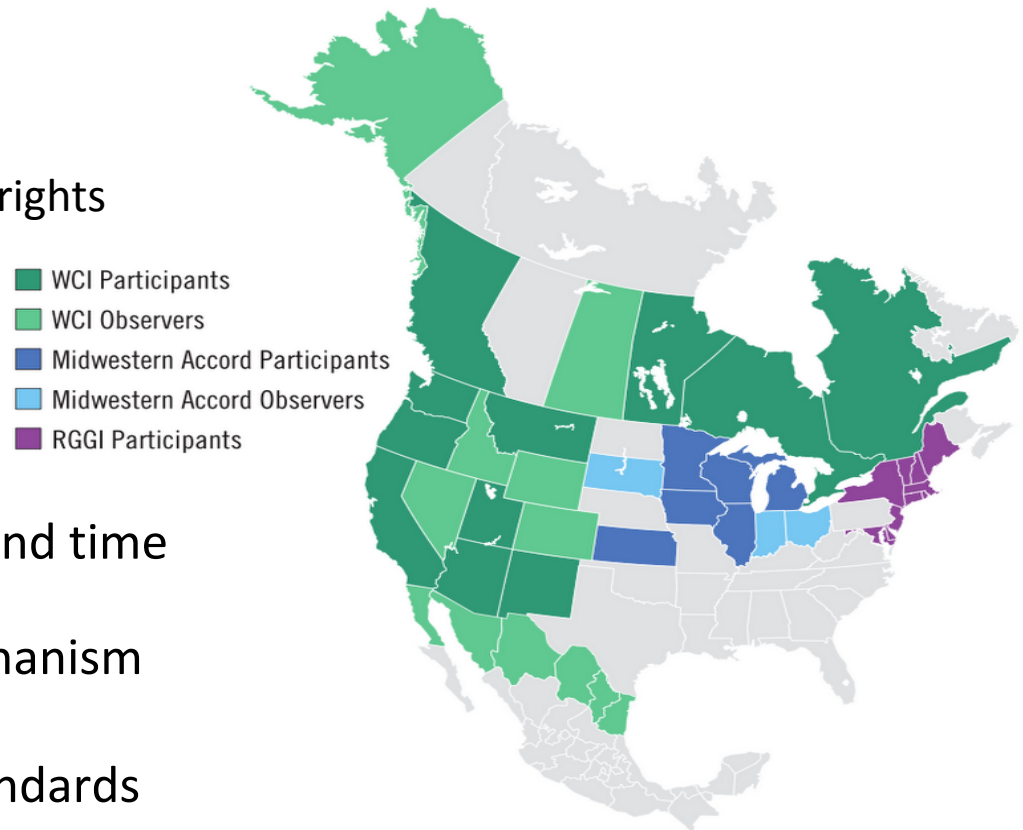
# Montreal Protocol & HFCs

- Amendment advanced by US, Mexico, Canada control HFCs
- Calls for **phasedown** – not **phaseout**
- Next Meeting 12/2010
  - China, India and Brazil oppose



# State “Patch Work” Initiatives

- **Western Climate Initiative**
  - Reduction Goal of -15% (2005 Levels) by 2020
  - Cap & Trade
- **RGGI**
  - Auctions at Utility for Pollution rights
    - Plants >25MW
  - 188 M Shot Ton cap
  - -2.5% /year beginning 2015
  - Proceeds to energy projects
- **Midwestern GHG accord**
  - Establish reduction targets and time frames
  - Develop cap-and-trade mechanism
  - Establish a tracking system
  - Develop low-carbon fuel standards



# States- California AB32

- Climate change law
  - 1990 Levels by 2020
- Cap & Trade to begin in 2012 but early actions in 2010
  - Refrigerant Rule (early action)
    - Adopted by CARB 12/9/2010
      - Effective 1/1/2011
    - Mandatory detailed facility reporting
    - Permits etc.
  - 2011 Records required April, 2012

# States- California Title 24

## Building and Energy Efficiency Standards for Residential and Nonresidential Buildings

- Effective - 1/1/2010
- 2011 code update

# States- California AB32

Refrigeration System	Registration Date	Reporting Date (for Prior Year)	Fees	Inspections
>2,000 Pounds	1/1/2012	2012	\$370	Stationary Leak Detection Systems
>200 Pounds	1/1/2014	2014	\$170	Quarterly or Leak Detection System
>50 Pounds	1/1/2016	N/A	\$0	Annually or Leak Detection
All service practices including record keeping, leak detection, leak repair, retrofit & retirement plans, <b>begin in 2011</b>				
<b>Other new record keeping requirements on Wholesalers &amp; Distributors and Reclaimers</b>				

# States- Other

- NJ GW Rule
  - Jan 2009 proposal to require addition of HFC refrigerants to existing community right to know (CMRTK) inventory law
    - Only specific NAIC Codes (not retail)
  - Annual release reporting if exceeds threshold by site 2,500 short tons (example ~1,300 lbs of R-404A)
  - Looking to follow CARB refrigerant rule
- MN Rule - Refrigerant Reporting
- MA & CT 2008 Rule - Reporting for large emitters





# Refrigeration Energy Initiatives

- Energy Policy Act of 2005
- Mandates maximum energy limits for display cases and storage cabinets
  - Energy Limits on Closed, Self-Contained Cases are set [ Jan 1, 2010 ]
  - DOE was mandated to set energy limits for remaining products by 1/1/2009 [ effective Jan 1, 2012 ]

# DOE Product Family Definitions – Standards

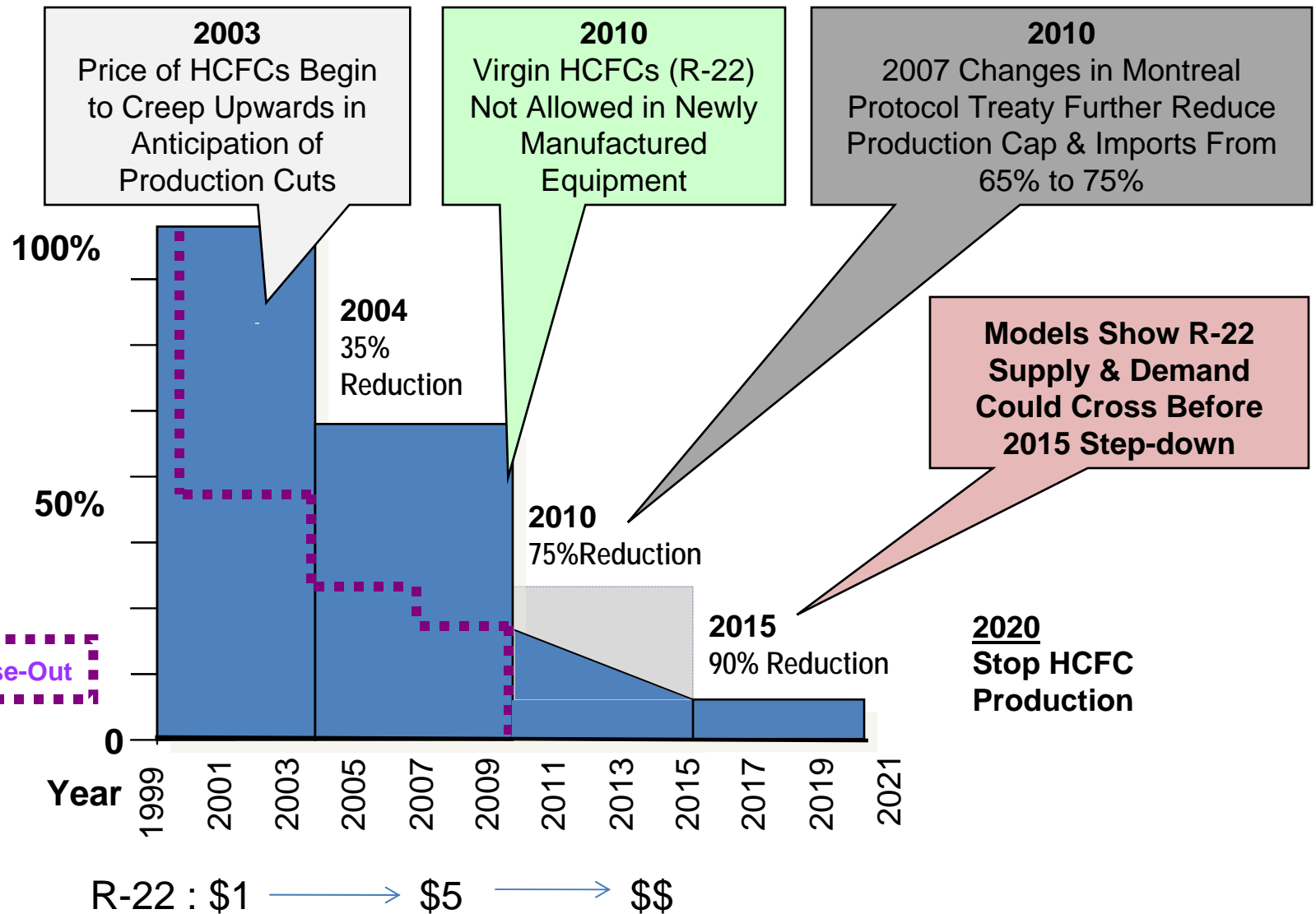
- Vertical Open (**VOP**)
- Semi-vertical Open (**SVO**)
- Horizontal Open (**HZO**)
- Vertical Closed Transparent (**VCT**)
- Horizontal Closed Transparent (**HCT**)
- Service Over Counter (**SOC**)



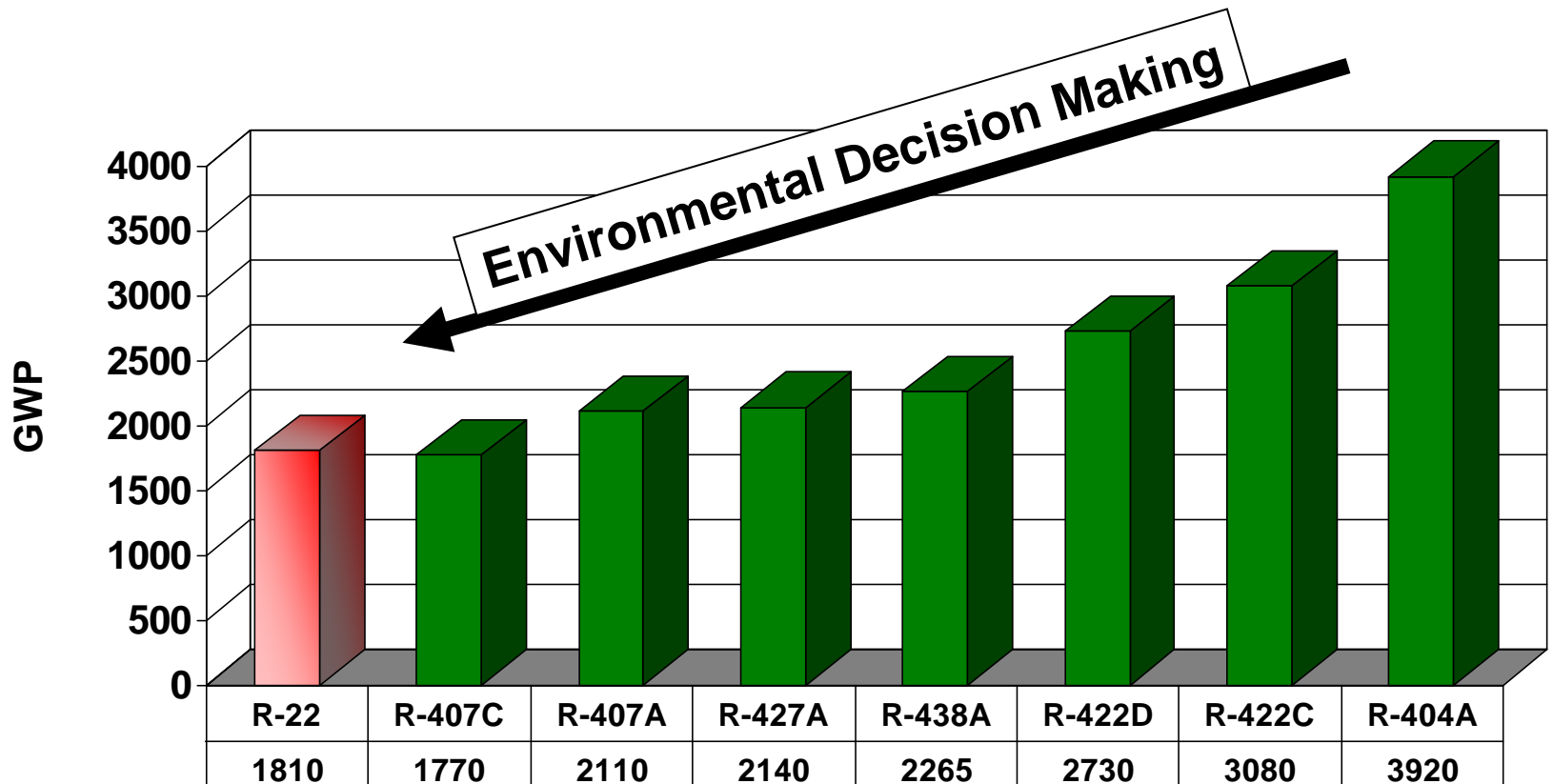
Equipment class <sup>2</sup>	Standard level <sup>***</sup> (kWh/day) <sup>***</sup>
VOP.RC.M .....	$0.82 \times \text{TDA} + 4.07$
SVO.RC.M .....	$0.83 \times \text{TDA} + 3.18$
HZO.RC.M .....	$0.35 \times \text{TDA} + 2.88$
VOP.RC.L .....	$2.27 \times \text{TDA} + 6.85$
HZO.RC.L .....	$0.57 \times \text{TDA} + 6.88$
VCT.RC.M .....	$0.22 \times \text{TDA} + 1.95$
VCT.RC.L .....	$0.56 \times \text{TDA} + 2.61$
SOC.RC.M .....	$0.51 \times \text{TDA} + 0.11$
VOP.SC.M .....	$1.74 \times \text{TDA} + 4.71$
SVO.SC.M .....	$1.73 \times \text{TDA} + 4.59$
HZO.SC.M .....	$0.77 \times \text{TDA} + 5.55$
HZO.SC.L .....	$1.92 \times \text{TDA} + 7.08$
VCT.SC.I .....	$0.67 \times \text{TDA} + 3.29$
VCS.SC.I .....	$0.38 \times V + 0.88$
HCT.SC.I .....	$0.56 \times \text{TDA} + 0.43$
SVO.RC.L .....	$2.27 \times \text{TDA} + 6.85$
VOP.RC.I .....	$2.89 \times \text{TDA} + 8.7$
SVO.RC.I .....	$2.89 \times \text{TDA} + 8.7$
HZO.RC.I .....	$0.72 \times \text{TDA} + 8.74$

Manufacturer / Customer can choose  
**how** the energy limit is met!

# Now: US HCFC Phase-Out



# Global Warming Potential



\*Values taken from IPCC 4<sup>th</sup> report

# What can I do Now?

- Lower Leak Rates
  - See issues and problems instantly
- Lower Refrigeration System's Full Charge
  - Secondary Loop- with glycol or CO2
  - Loop Piping- case control (less piping)
  - Distributed- move systems closer to cases
- Use lowest GWP refrigerant w/best capacity & energy efficiency in new systems & retrofits

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