



# Coca-Cola System Commitment to Sustainability

- Live Positively Platform
- Environmental Initiatives
  - Energy Conservation and Climate Change
  - Water Stewardship
  - Sustainable Packaging / Recycling



## LIVE POSITIVELY

"Sustainability and social responsibility are not public relations initiatives, or compliance check-offs, or nice to-dos.

In a world where populations are growing, where natural resources are stressed, where communities are forced to do more with less, and where consumers' expectations are expanding, sustainability is core to our business continuity and survival."

> Muhtar Kent Supplier Sustainability Summit, 2009

#### Marketplace



Quenching every thirst and need, providing and tailoring beverages for every lifestyle, life stage, and life occasion based on individual needs

Delivering quality you can trust all the time

#### Communities





Helping to end inactivity and enhance health

Raising the standards of physical fitness globally through encouragement, sponsorship, and grassroots programs



Committing to the needs of our communities, with wide-ranging programs in every community where we do business

#### Workplace



Fostering open environments, as diverse as the markets we serve. where workplace rights are respected and people are inspired to create superior results and make a positive difference



Climate Protection

Growing the business, but not the carbon in our manufacturing operations

Improving energy efficiency and reducing emissions of greenhouse gases in cold drink equipment

#### Environment

Sustainable Packaging



Creating a world in which our packaging is no longer seen as waste, but as a valuable resource for future use





Safely returning to nature an amount of water equivalent to what we use in all of our beverages and their production

Coca-Cola is committed to creating a culture that enhances our environmental sustainability





### **Environment: Climate Protection**

#### **Climate Action is Good Business**

Doubling our business in a carbon constrained world requires us to cut waste and innovate new solutions



#### **Grow the Business; not the Carbon**

Stabilizing emissions in our manufacturing offers a real return on investment of the Coca-Cola system - and the planet. Coca-Cola operates the largest hybrid electric vehicle fleet in the world, heavily reducing fuel use and emissions.



We are taking action to improve energy efficiency and reduce emissions of potent greenhouse gases

Additional information available at

<u>www.theCocaColaCompany.com</u>>Sustainability>Energy Efficiency & Climate Protection









## **Discussion Points**

- Profile carbon footprint of Coca-Cola cold drink machines
- 2. Tactics to reduce equipment energy use
- 3. Conversion to HFC-free refrigerants



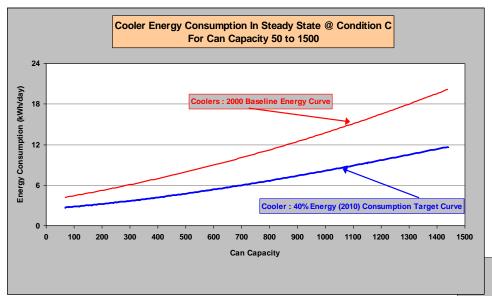
## **Cold Drink Equipment Energy Efficiency**

**Environmental Policy for Cold Drink Equipment** 

"We will require suppliers to significantly improve the energy efficiency of the cold-drink equipment they sell our system, making it 40-50 percent more energy-efficient by the end of this decade." Doug Daft - June 27, 2000

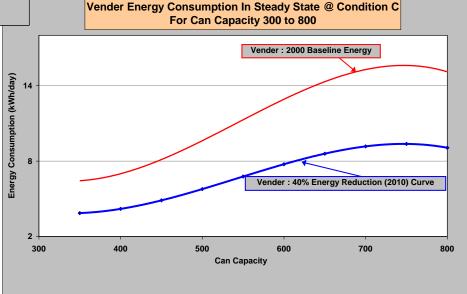






We modeled the energy use profile of the cold drink machines we were purchasing.

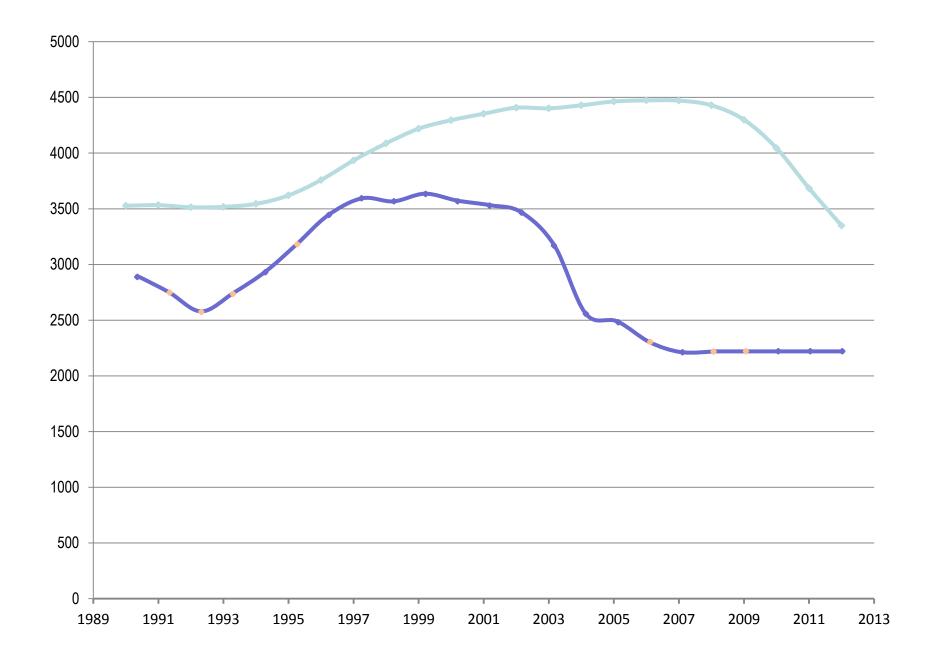
We used current state-of-the-art technologies to bring us to our 40% improvement in energy efficiency.

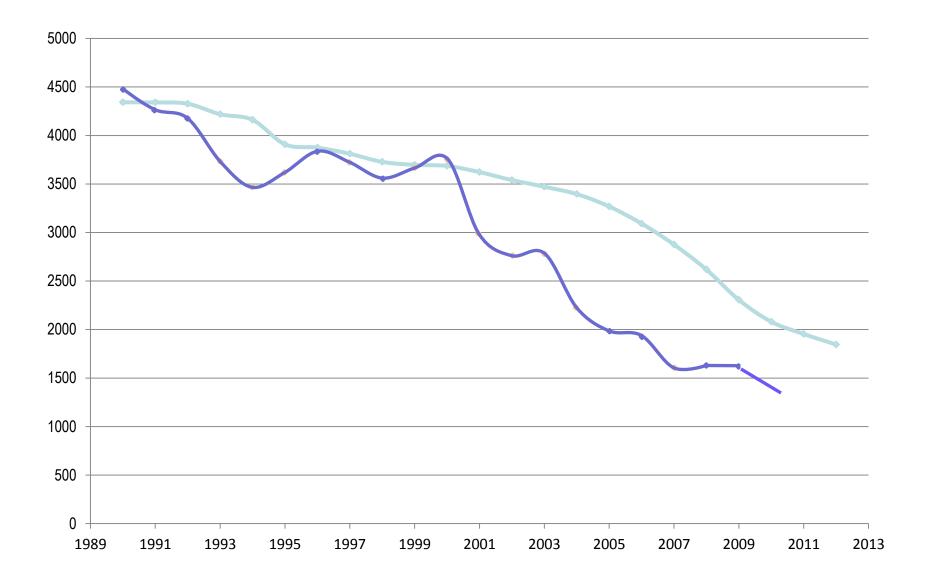




## **Technologies and Designs for Efficiency Improvements**

- Higher Efficiency Compressors
- Liquid Suction Heat Exchangers
- Increased Condenser Surface Area
- Higher Efficiency Condenser Fan Motors
- Variable-Speed Condenser Fan Motors and Condenser Fan Motor Controllers
- Higher Efficiency Condenser Fan Blades
- Higher Efficiency Expansion Valves
- Higher Efficiency Evaporator Fan Motors
- Improved air-movement and heat exchange in cabinet
- Higher Efficiency Lighting
- Higher Efficiency Lighting Ballasts
- Insulation Increases or Improvements
- Vacuum Insulated Panels







## **Cold Drink Equipment Energy Efficiency**

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"We will require suppliers to significantly improve the energy efficiency of the cold-drink equipment they sell our system, making it 40-50 percent more energy-efficient by the end of this decade." *Doug Daft - June 27, 2000* 

- The average CCNA new cooler purchase is 51% more efficient than year 2000.
- Some cooler models are up to 73% more efficient.
- The average CCNA new vending machine purchased is 57% more efficient than year 2000.
- Some vendor models are up to 63% more efficient.

All without the use of EMDs



## **Progress with Energy Efficiency**

- Achieved the 2010 goals for energy efficiency
  - All coolers meet the new corporate energy consumption requirement
  - Exceed the goal for coolers by at least 18%
  - DOE vendors and Energy Star coolers will continue to widen the gap
- Committed to improving energy performance of our equipment, and achieving 2020 goals
  - Steadily improving the energy performance for over 10 years.
- Although an EMS is not needed to achieve goals, Coca-Cola is committed to EMDs



## **EMS-55 Energy Control**



Keeps beverages cold when consumers make purchases.

The EMS-55 has the potential to reduce energy consumption up to 45% depending on the machine model it is in, operating conditions, equipment configuration, account activity and beverage throughput.





## **EMS-55 Energy Control**



Keeps beverages cold when consumers make purchases.

- Patented self-learning module of account activity
- Puts machine into energy-saving mode based on learned traffic and/or sales activity
- 35% savings on average in a cooler
- 20% savings on average retrofitted in a vendor



## **Energy Management System**

#### How does the Coca-Cola EMS-55 work?

The EMS-55 unit will learn the store opening and closing times using a movement sensor, and door switch (on coolers) to put the machine into one of two modes:

- Mode 1: (Normal) Store open:
   Machine operates normally, chilling the products to an average of 36°F
- Mode 2: (Stand-by) Store closed:
   Machine automatically turns the lights off and raises average product temperature to 45°F
- Once EMS-55 has learned the opening and closing times, the machine will bring all of the products back down to the average of 36°F - cold for when the store opens.





## **Energy Management System**

EMS-55 Motion Sensor - Cooler





**Detection** Area

**Movement Sensor** 





## **Energy Management System**

EMS-55 Motion Sensor - Vendor

2011









## **Self Learning -**

Following pattern downloaded at 7:09am on April 18, 2007

	Midnight		1:00 AM		2:00 AM		3:00 AM		4:00 AM		5:00 AM		6:00 AM		7:00 AM		8:00 AM		9:00 AM		10:00 AM		11:00 AM		12:00 Noor		1:00 PM		2:00 PM		3:00 PM		4:00 PM		5:00 PM		6:00 PM		7:00 PM		8:00 PM		9:00 PM		10:00 PM		11:00 PM	
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	1	0	0	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	1	0	0	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	0	0	2	0	0	0	0	0	0
Thursday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	0	1	0	0	0	0	0	0	0
Friday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0
Saturday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0

Following pattern downloaded at 1:34pm on April 27, 2007

	Midnight		1:00 AM		2:00 AM		3:00 AM		4:00 AM		5:00 AM		6:00 AM		7:00 AM		8:00 AM		9:00 AM		10:00 AM		11:00 AM		12:00 Noc		1:00 PM		2:00 PM		3:00 PM		4:00 PM		5:00 PM		6:00 PM		7:00 PM		8:00 PM		9:00 PM		10:00 PM		11:00 PM	
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monday	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	0	1	0	1	1	0	0	0
Tuesday	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	1	2	0	0	0	0	0	0
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Saturday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

С

Following pattern downloaded at 5:15pm on May 4, 2007

	Midnight		1:00 AM		2:00 AM		3:00 AM		4:00 AM		5:00 AM		6:00 AM		7:00 AM		8:00 AM		9:00 AM		10:00 AM		11:00 AM		12:00 No		1:00 PM		2:00 PM		3:00 PM		4:00 PM		5:00 PM		6:00 PM	7.00	7:00 PIM	_	8:00 PM		9:00 PM		10:00 PM		11:00 PN	
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0	0	0	0	0	0	0	0	0	0
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Tuesday	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1 (	0	0	0	0	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1 '	1	0	0	1	0	0	0	0	0	0
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Saturday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0 (	0	0	0	0	0	0	0	0	0	0



## EMS-55 operational approach

#### Energy Reductions Achieved By:

- Monitoring the traffic patterns to learn when the store is open / closed
- Allowing the machine to warm up slightly during hours when the outlet is closed and no sales are possible
- Commencing recovery of the machine to "in spec" temperatures with enough time to ensure that even the first sale is within temperature specs
- Control the lights (and fans in cooler) to reduce unnecessary energy consumption

#### Reduction In Service and Repair Achieved By:

- Reductions in refrigeration system / lights / fans run time result in longer life
- Monitoring conditions which lead to refrigeration system failure (in coolers), and protect the refrigeration system when harmful conditions are detected
- Track refrigeration system statistics
- Provide diagnostic codes to assist in service and repair efficiency



## **EMS-55 Vendor Retrofit Kit**



- Fast install
- Agency Certified for field installation





## Vendor Retrofit Kit Energy Savings



- Average energy savings: 20%
- Overall savings range from 15% to 34% in active accounts
- Daily energy savings up to 45% in active accounts



## Vendor Retrofit Kit Operation



- Works well with block timers
- Responds to time and schedule changes.



## E+SC 2011

## Energy & Store Development Conference



#### Field Use (after 5 months)









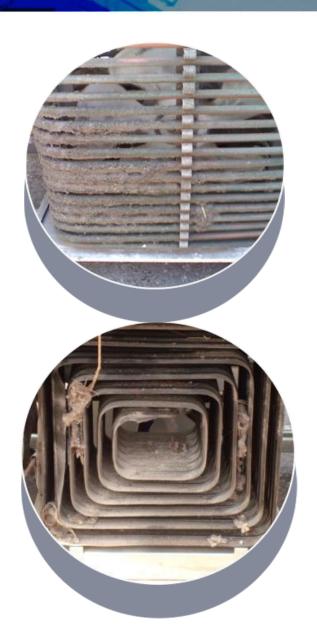


# Without a maintenance-free condenser

2011

The condenser becomes dirty from being placed at ground level and because it is not easily accessed by the operator. Only a technician can do this task properly.

The dirtier the condenser the higher the energy consumption, and the machine's carbon footprint increases dramatically.





## **EMD Rollout**

#### **EMD Strategy in vending:**

- Embed the EMS IP into the vending controller
- Execute with "Envirovend" remanufactured and new stack machines, Glass Front next
- More cost-effective execution than Retrofit Kit







## **Refrigeration Equipment**

- Coolers and vending machines make up the largest component of our System's HFC emissions.
- We have already transitioned to HFC-free insulation for new purchases of refrigeration equipment
  - This new insulation generates 3/4 fewer direct greenhouse gas emissions as compared with traditional equipment
- TCCC has invested \$10 mm to identify and test CO2 as an alternate refrigerant
  - Carbon dioxide technology generates 1/4 fewer direct greenhouse gas emissions from refrigerants

Combined, these technologies will reduce direct and indirect carbon emissions by over 3 tons over the lifetime of each typical machine.





## **HFCs and the Climate Crisis**

- F-gases, primarily used for refrigeration and cooling, represent 17% of the world's current global warming burden.
- The problem was exacerbated by the Montreal Protocol when CFCs were banned and HFCs and HCFCs were sanctioned as "environmental" replacements for CFCs.
- The result has been an increasingly devastating impact on global warming.
- There are feasible replacements for almost all current F-gas uses, but not without cost and challenge.
- U.S. lags far behind much of the world in deploying low-GWP alternatives due to regulatory restrictions and increased investment.
- Movement already underway by Obama Administration to pursue incentives, elimination of barriers and regulation on F-gases and overall Climate Change legislation





## **European Parliament calls for action to phase down HFCs**

A Motion for a Resolution adopted yesterday, 14 September 2011, in the European Parliament urges the European Union to be more pro-active in reducing non-CO<sub>2</sub> climate-relevant gases, especially emissions of fluorinated gases (f-gases).

The Members of the European Parliament (MEPs) have expressed in their Resolution as well as in Tuesday's discussion with the European Commissioner responsible for Climate Action, Connie Hedegaard, that prompt action to phase down hydrofluorocarbons (HFCs) is crucial, as their contribution to total greenhouse gas emissions is mounting.



The author of the Resolution, MEP Theodoros Skylakakis, stressed that "destroying these gases is very important because they will make up 20% of global gas emissions by 2050."



## **HFC – Free Machines**

In February 2000, Doug Daft, Coca-Cola Chairman & CEO, promised Greenpeace and the world that Coca-Cola would stop purchasing colddrink equipment with HFC refrigerants. HFCs are powerful greenhouse gasses. Cost-effective alternatives were not available when the Company decided to take this direction.

In December 2009, Muhtar Kent, Coca-Cola President & CEO, in a joint press conference with Greenpeace, gave a timetable for Coke conversion to HFC-free refrigerants in cold-drink equipment.

"Let me reiterate, by 2015, we're committed to having 100 percent of all our new cold drink equipment be HFC-free. And by as early as 2012, 50 percent of our new equipment will be HFC-free."

Muhtar Kent, Chairman and Chief Executive Officer, The Coca-Cola Company Media Teleconference with Greenpeace December 3, 2009





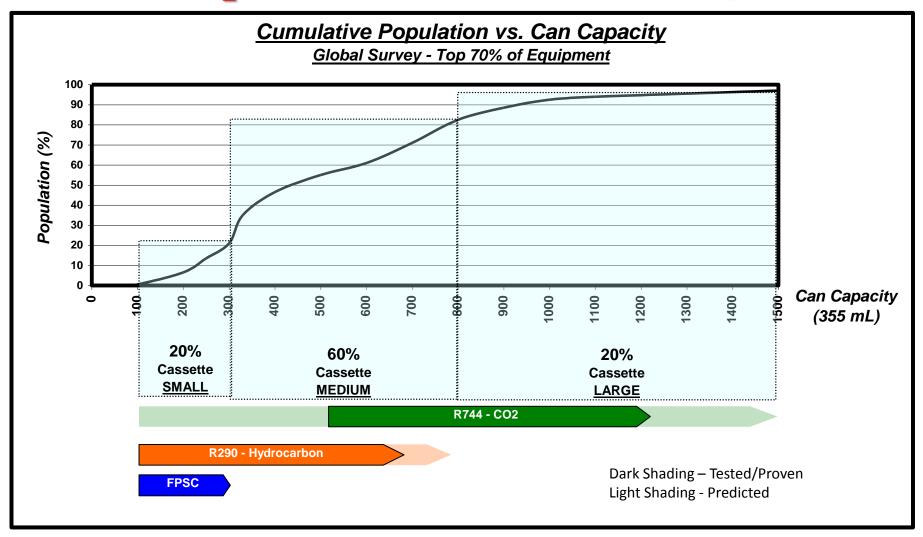
## **Technologies explored**

2000: Technology Surveys
<ul><li>Primary – Stirling, CO<sub>2</sub>, HC</li></ul>
☐ Secondary – Magnetic, Peltier, Linear Compressor, Cool Chips, Brayton, etc.
2001: Technology Development ☐ Stirling ☐ CO <sub>2</sub>
2002: Technology Development; System Integration ☐ Stirling ☐ CO <sub>2</sub>
2003: System Integration; Assessment
Stirling
☐ HC (Olympics Contingency)
2004: Focus on pre-Commercialization
$\square$ $CO_2$
Cassette





## **CO<sub>2</sub> Provides Greatest Coverage**



<sup>\*</sup> Not Inclusive of Japan Equipment Population





## **HFC – Free Machines**





2011



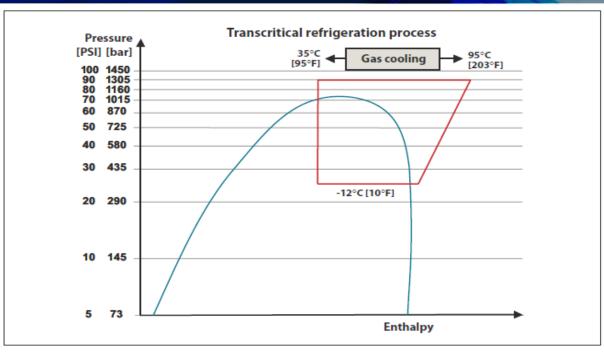


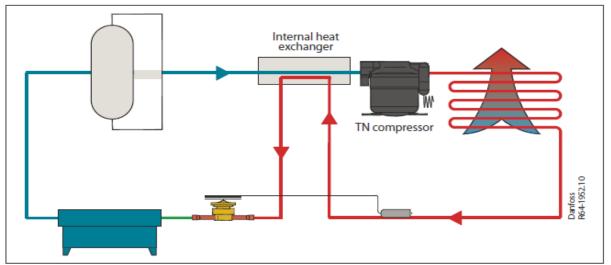
## Approach:

To achieve this HFC-free goal, commercialize cold drink equipment that operate with the HFC-free CO2 refrigerant.











## **HFC-Free Cold Drink Equipment**

"Let me reiterate, by 2015, we're committed to having 100 percent of all our new cold drink equipment be HFC-free. And by as early as 2012, 50 percent of our new equipment will be HFC-free."

Muhtar Kent, Chairman and Chief Executive Officer, The Coca-Cola Company Media Teleconference with Greenpeace December 3, 2009

- Currently > 1600 HFC-Free machines in North America
- 375 vending machines
- 1281 coolers
- Target: at least 50% of new purchases in 2012



## **2012-2015 HFC-Free Equipment Conversion**

Permitted refrigerants by the U.S. and Canadian governments:

- CO2 for coolers: fully allowed
- CO2 for venders: allowed under test exemption;
   SNAP approval expected next year
- R600a refrigerators: not allowed; SNAP pending
- R290 for coolers: not allowed; SNAP pending
- R290 for venders: not allowed



## **Coca-Cola Climate Friendly Machines**

- Completely HFC-free, and largely uses CO2, which is 1430 times less potent a greenhouse gas as commonly used R134a. CO2 is a natural substance. CO2 is non-flammable, and non-toxic.
- Uses a CO2 refrigeration system and HFC-free insulation foam. These technologies reduce potential direct equivalent greenhouse gas emissions by almost 100% (approximately 99%).
- The energy efficiency and refrigeration capacity of CO2 is comparable to R134a, and at lower ambient temperatures, field test results indicate that CO2 is more efficient than R134a. Data from field tests indicate a 2% - 7% reduction in energy consumption over R134a equivalent machines in equivalent conditions.
- Contains an intelligent energy management system (EMS-55) reducing energy use and indirect carbon emissions by turning off lights when the store is closed.
- Typical Climate-Friendly Machine will reduce direct and indirect greenhouse gas emissions by over 3 tons over the machine's lifetime.



## Thank you.