HFC MVAC Emission Mitigation

Air Resources Board Public Workshop

Sacramento, CA

February 5, 2008

ARPI
Automotive Refrigeration Products Institute

- Coalition of companies packaging & distributing DIY automotive air conditioning products
- Committed to reducing Greenhouse Gas Emissions
- The driving force in mobile refrigerant industry
  - Educating public on proper use of refrigerants
  - Innovations in can & refrigerant use safety
  - Designed unique R-134a fittings to facilitate & safeguard transition to SNAP approved non-CFC refrigerants

AB 32
Emission Reductions Requirements

- Cost effective
- Technologically feasible
- Ensure that regulations do not disproportionately impact lower-income communities

California Health and Safety Code 38500 et seq.

About Air Conditioning

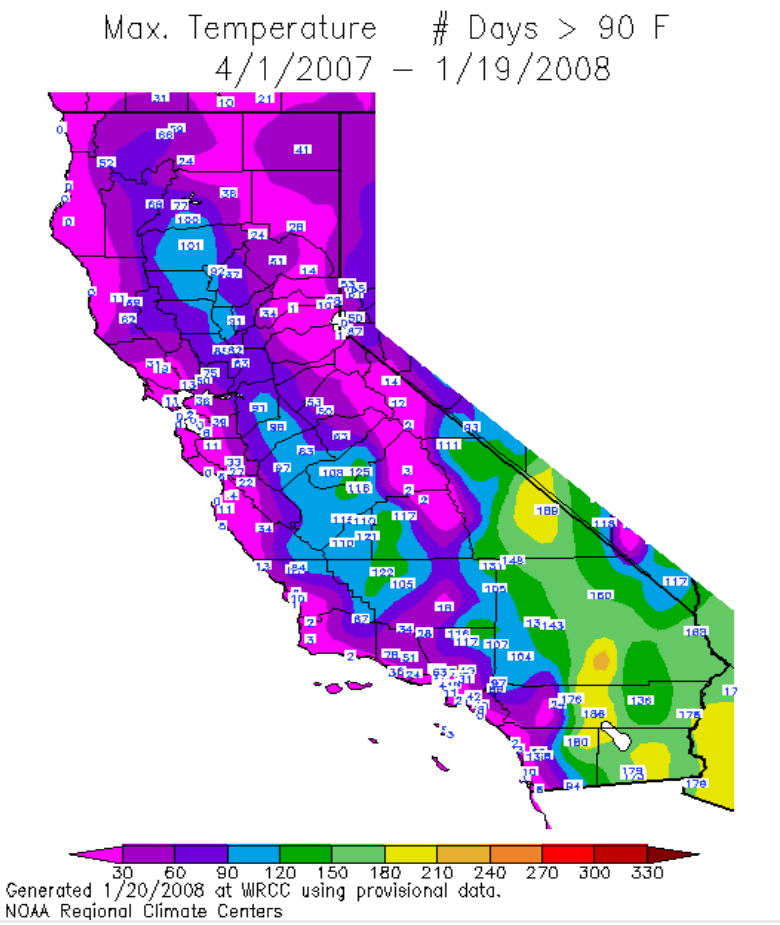
- Refrigerant R-134a
  - Tetrafluoroethane (CH2FCF3)
    - An inert gas used primarily as a refrigerant for domestic refrigeration and automobile air conditioners
    - Other uses include plastic foam blowing, propellant for the delivery of pharmaceuticals, gas dusters and air driers

Air Conditioning…Continued

- Packaging
  - A packager converts raw R-134a refrigerant into a consumer product
    - Packaging refrigerant into small cans
    - Adding product value
      - Leak-cessation compounds
      - System conditioning oils
      - Refrigerant boosting additives
    - Adding user value
      - Dispensing systems and detailed instructions
      - Measuring gauges to ensure proper charging

Air Conditioning…Continued

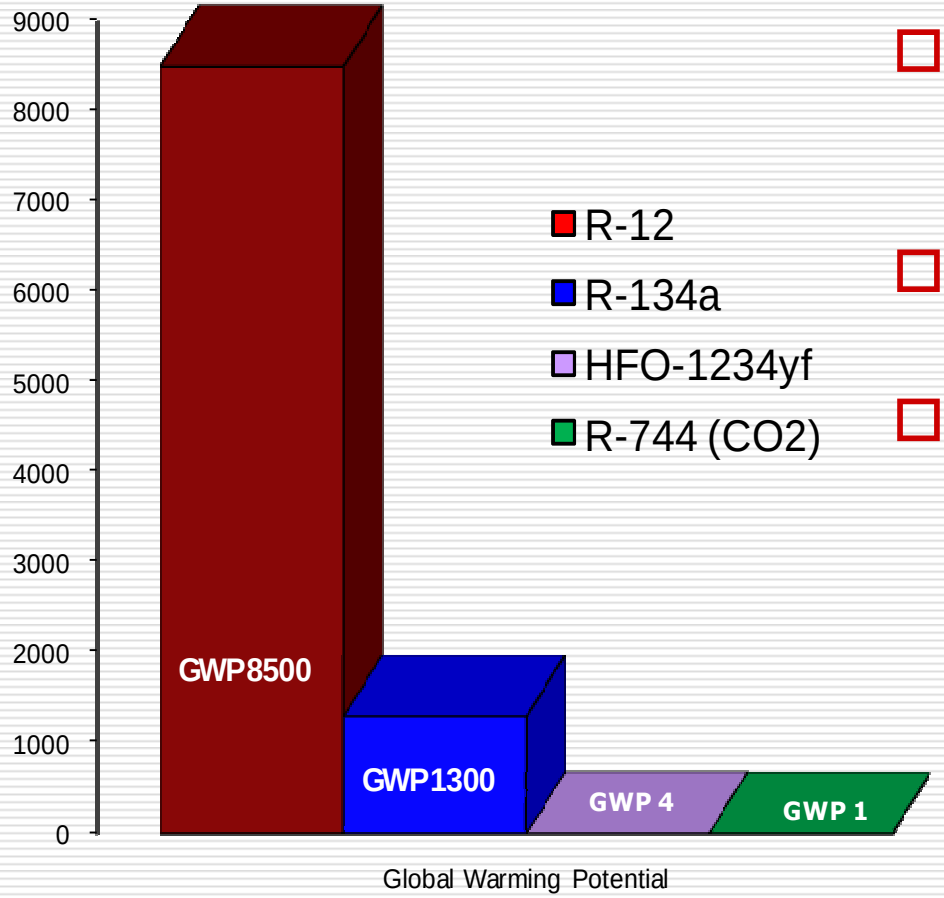
- Little question that most Californians need air conditioning



A History of Cooperation

- The Past…R-12 (Freon) Conversion
  - Industry led transition to non-ozone depleting refrigerant when R-12 was found to be ODS
  - Systems engineered for easy conversion
  - ARPI members developed unique fittings
  - Transition facilitated by restrictions & R-12 floor-tax

New Low Global Warming Refrigerant Coming by 2012



- Honeywell & DuPont collaborating on low-GWP refrigerant
- Industry's technological advances reduce impact
- GWP of refrigerant decreased markedly
  - 1990: GWP 8,500
  - 2000: GWP 1,300
  - 2012: GWP 4

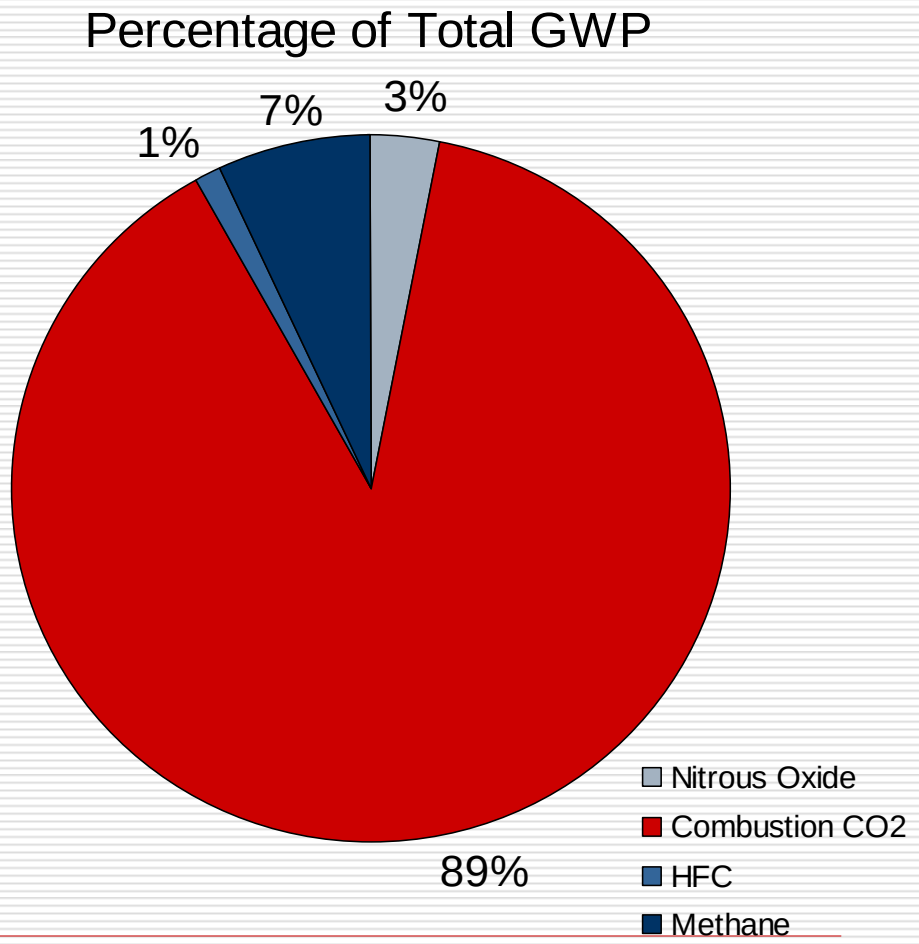
A Future of Cooperation

- The Future…R-134a Conversion
  - Will replicate successful R-12 replacement
  - Encourage safe and effective replacement for R-134a systems
  - Ensure proper infrastructure for replacement

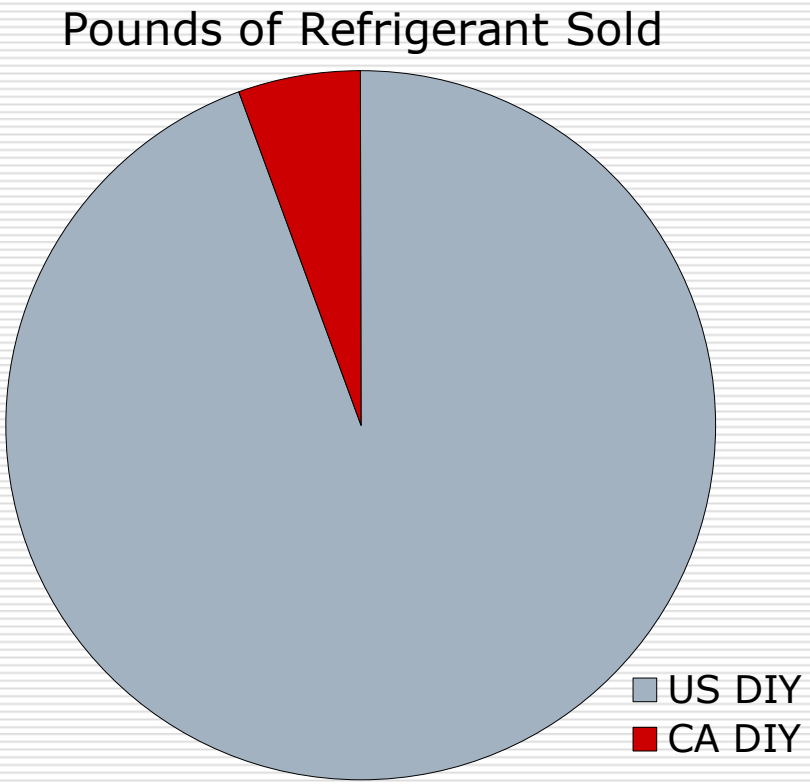
Global Warming Potential Context

According to AD Little Study (1999):

- CO2 from combustion top contributor
- HFCs only 1% and mobile A/C 5% of the 1% HFC slice



Emissions Attributable to Small Can



- Total lbs of refrigerant sold to DIY in 2006
- US DIY sales:
  - 19,335,000 lbs
- CA[1] DIY sales:
  - 1,160,000 lbs
  - 0.69 MMTCO2E (Million Metric Tons of CO2 Equivalent)

1: Percent of CA small can sales of R-134a provided by leading retailers AutoZone and Wal-Mart

Early Emissions Assumptions

- 2006 CAT Report:
  - CARB estimated HFC-134a emissions at 2.4 MMTC02E
- 2007 Early Action Reassessment:
  - With industry assistance, CARB recalculated estimated emissions at 1 to 2 MMTC02E
- 2008 Studies to fine-tune data:
  - CARB commissioned "Practice Evaluation of Small Can Users" study fine tuning data
  - For first time, HFC-134a will be reported in CA consumer & commercial products survey

Social Segment Impact

Who uses the small can and why?

- Low-Income and Fixed-Income Californians (many minority & seniors) who can't afford to take their vehicle to a shop for service
- Independence and Can-do Attitude
- Ensure Quality of Work
- Pride of Ownership in Maintaining Vehicle

Social Segment Advocacy

- Environmental Justice Advisory Committee recommends
  - Removing ban from early action list
  - Taking a broader review of HFC reductions and focus on larger sources of HFCs
    - Referred to proposed ban as “regressive”
    - Urged CARB to look to higher reduction measures
    - Lamented burden on low income & minorities

Aggravating Emissions Factors

- Can heel:
  - Residual refrigerant in can after use
- Improper handling:
  - Refrigerant loss connecting attachments
- Leak-refill cycle:
  - Charging of leaking system without addressing underlying need for repair
- Old components:
  - Older fittings & connections far less efficient

Mitigating Behavior

- Consumer education
  - Proper use of refrigerant and tools
  - When to seek professional help
- Enhanced instructional media
  - How-to videos
- Used can collection for recycling
  - Simple, return to retail
  - Cash refund incentive
  - Consumers want to “do the right thing”

Economic Impact

- Disproportionately, most direct effect would be on lower income Californians
  - *How much?*
  - Incremental consumer cost: **$166,499,000**

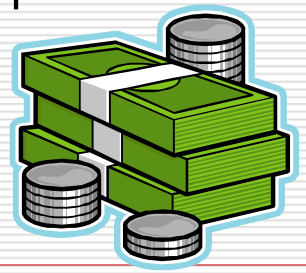
(Frost and Sullivan Study, 2006)

Do-it Yourself Cost, per pound of R-134a:

$13.32

Professional Mechanic Installed, cost per pound:

$156.81



Alternative Regulatory Proposal

- Three-part proposal
  1. Industry's addition of self-sealing valve
     - Minimize accidental discharge
     - Preserve contents for reclamation
  2. Used can collection for recycling
     - Simple, return to retail
     - Cash refund incentive
  3. Consumer education
- Combine with MVAC leak test within CA Smog Check program

New Self-Sealing Can Top

- To be incorporated on all 2 to 24oz cans
- Prevent accidental refrigerant emissions from used small cans
- Mitigate 97 to 99% potential can heel emissions
- Leak rate limit being established and verified by independent test laboratory

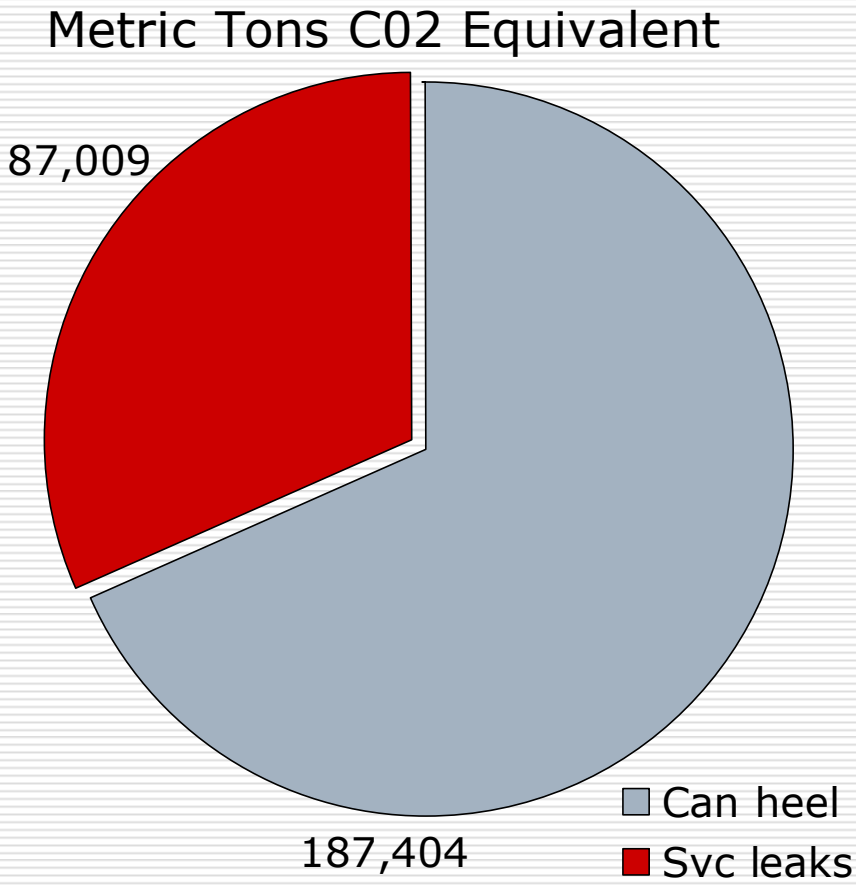
Recycling Program

- Voluntary industry-administered Used Can Collection, R-134a Reclamation & Recycling for California
  - $1 consumer return incentive
  - Established logistics and processes
- Sharing expertise with CA Integrated Waste Management Board
- In service in CA by January 1, 2010

Alternative Proposal Emissions
Reductions in Global Warming Potential

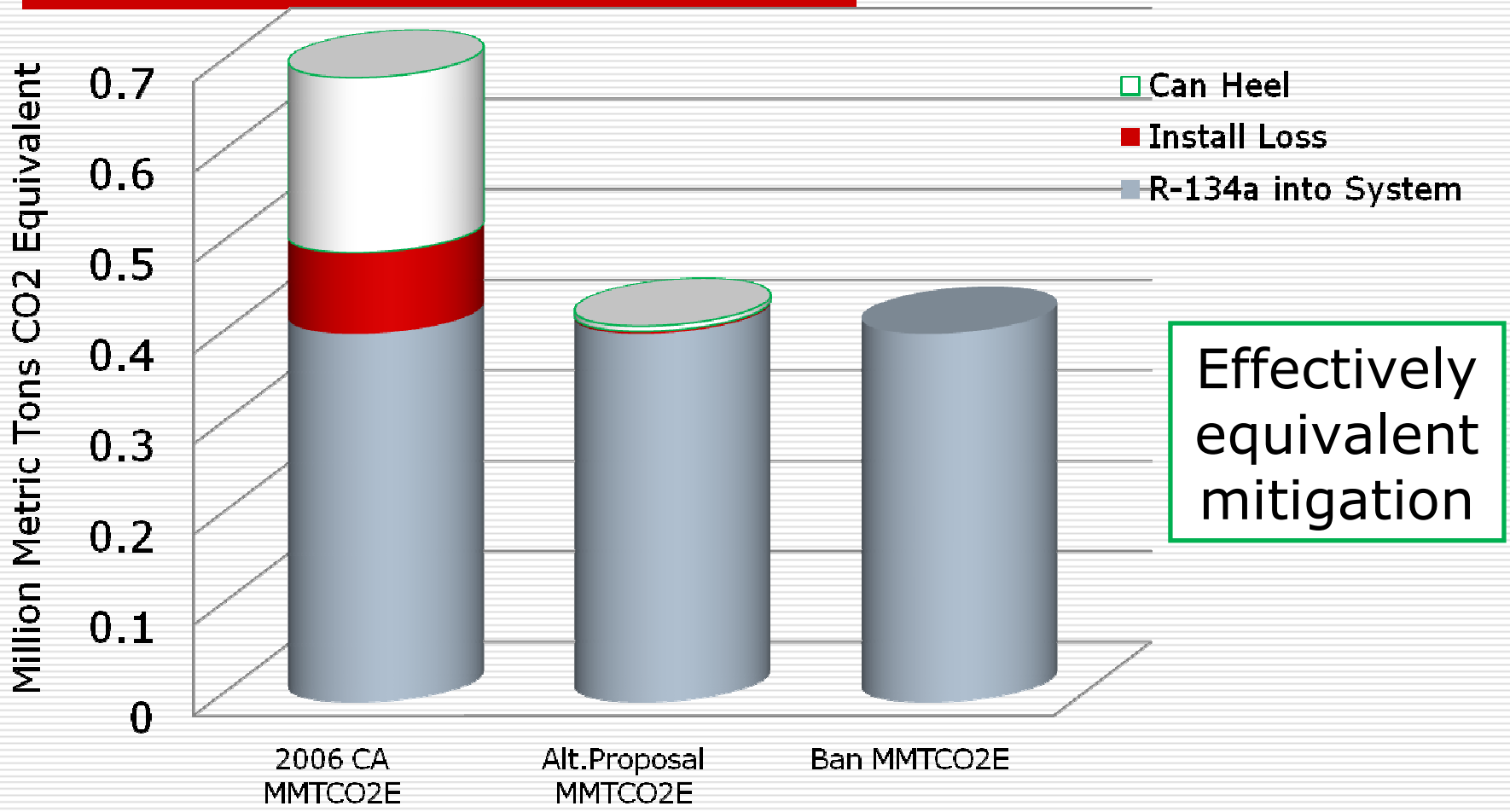
- GWP Savings of alternative proposal
  - Reducing can heel
  - Reducing leaks from improper servicing:

274,413 MTC02E*



• ***Note**: For the purposes of this document, ARPI is using Armines' 07-Nov-07 preliminary report of theoretical 28% heel and 13% DIY installation loss as one basis for calculations. Use of this preliminary data does not represent ARPI acceptance of its accuracy or validity until final results are published, reviewed and agreed upon.*

Emissions Savings Illustration:
2006 Actual vs. ARPI Alternative & Ban



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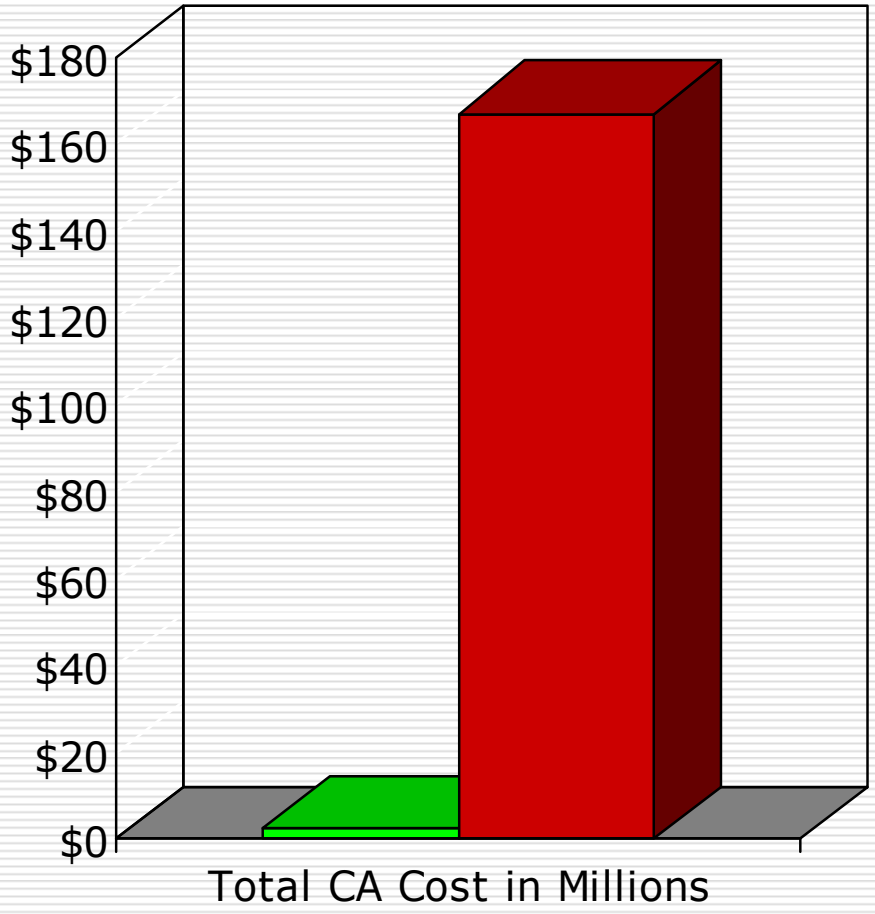
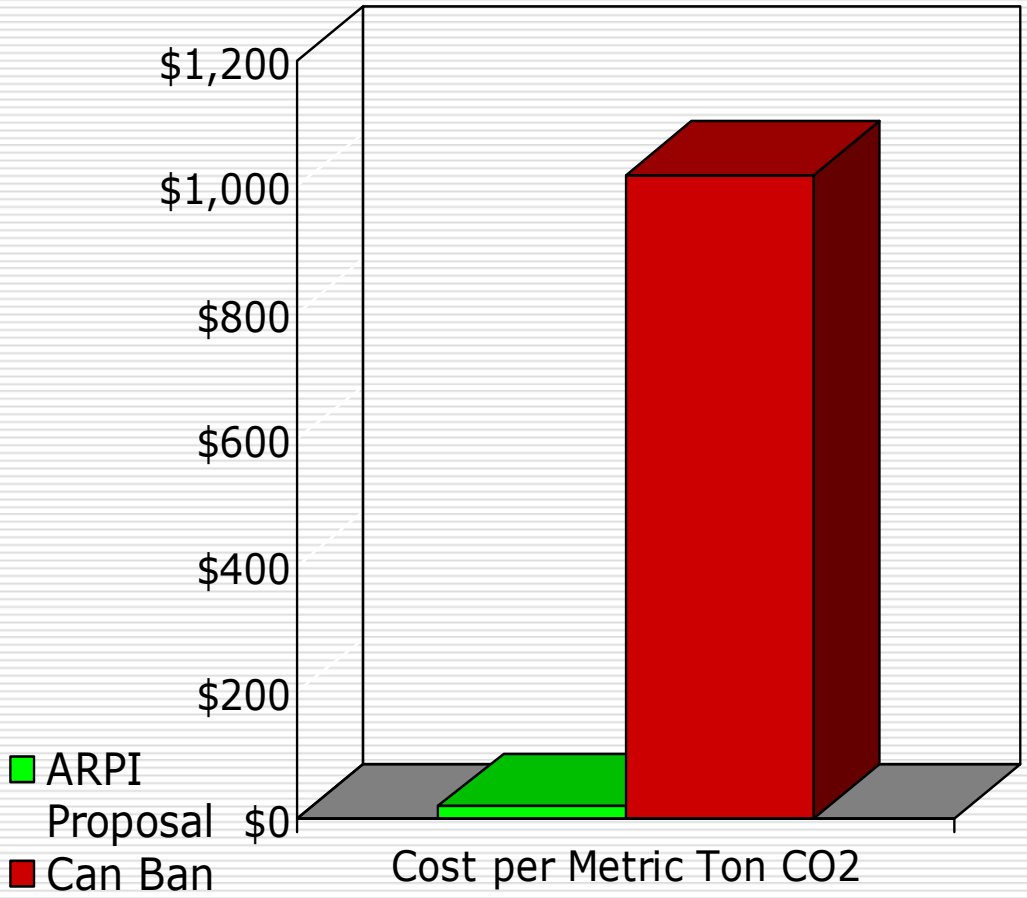
Alternative Proposal Cost

- Estimated cost of ARPI alternatives: $2,500,000
- Estimated cost of can ban to California consumers: $166,499,000
  - Nationwide: $2.76 billion
- Alternative:
  - $164 million less



Cost Effectiveness Comparison



- ARPI alternative will cost consumers $18/MTC02E
- Ban will cost consumers $1018/MTC02E
- Alternative proposal
  - Achieves real mitigation
  - Saves consumers $1000 per MTC02E

Summary

- In many parts of California, air conditioning is a necessity
- ARPI's cooperative, voluntary measures offer equivalent GWP savings to early action restriction (ban)
- AB 32 requires cost effectiveness and fairness to low-income citizens
- Industry's alternative proposal is cost effective
- New, low GWP refrigerant on the way