# Development, Implementation, and Enforcement of U.S. Energy Efficiency Standards in Air-Conditioning and Refrigeration Sectors

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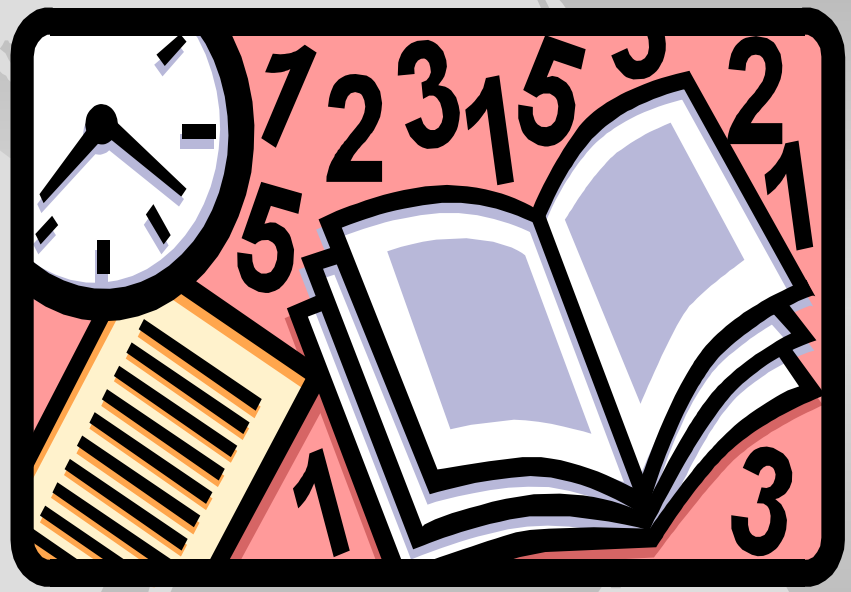
# Agenda

- Introduction
- Energy Efficiency Standards in the U.S.
  - NAECA
  - EPACT
  - ASHRAE 90.1
  - State Regulations
  - EPA
- Enforcement
- Conclusions



# Introduction

- Long history of federal, state, voluntary, and mandatory energy efficiency standards in the U.S.
- The battles and debates have steadily increased amongst stakeholders over the years
- Majority of US HVACR products are covered under the following energy efficiency standards:
  - NAECA
  - EPACT
  - ASHRAE 90.1
  - State Regulations
  - EPA

# Introduction

- First Voluntary Energy Efficiency Standards Introduced in 1975 (ASHRAE 90)
  - Covered residential and commercial HVAC equipment
    - Unitary Equipment
    - Chillers
    - Packaged Terminal Equipment
    - Water-Source Heat Pumps
- First Mandatory_Energy Efficiency Standards Prescribed In California in 1976
  - Covered appliances (Refrigerators, Room Air Conditioners, etc.) and Residential Central Air Conditioners

# Introduction

- 1975 – EPCA Enacted By Congress
  - Directed federal energy administration to establish test procedures and voluntary energy efficiency improvement targets for home appliances
- 1978 – NECPA Amended EPCA
  - Directed DOE to establish federal energy efficiency standards to replace voluntary EPCA standards

# Introduction

- 1987 – NAECA established minimum federal energy efficiency standards
  - 12 categories of residential appliances including room A/C and central A/C
- 1990 - Section 608 of the Clean Air Act
  - Amendments directed EPA to establish regulations that reduce the use and emissions of ozone-depleting substances
- 1992 – EPACT amended EPCA
  - directed DOE to establish mandatory minimum federal energy efficiency standards for commercial equipment

# Energy Efficiency Standards in the US

- National Appliance Energy Conservation Act (NAECA) established in 1987
- Sets federal minimum efficiency standards for many appliances
- Preempts state standards
- Current efficiency levels (since 1992)
  - 10 SEER/6.8 HSPF for split AC /HP
  - 9.7 SEER/6.6 HSPF for single package AC/HP

# Energy Efficiency Standards in the US

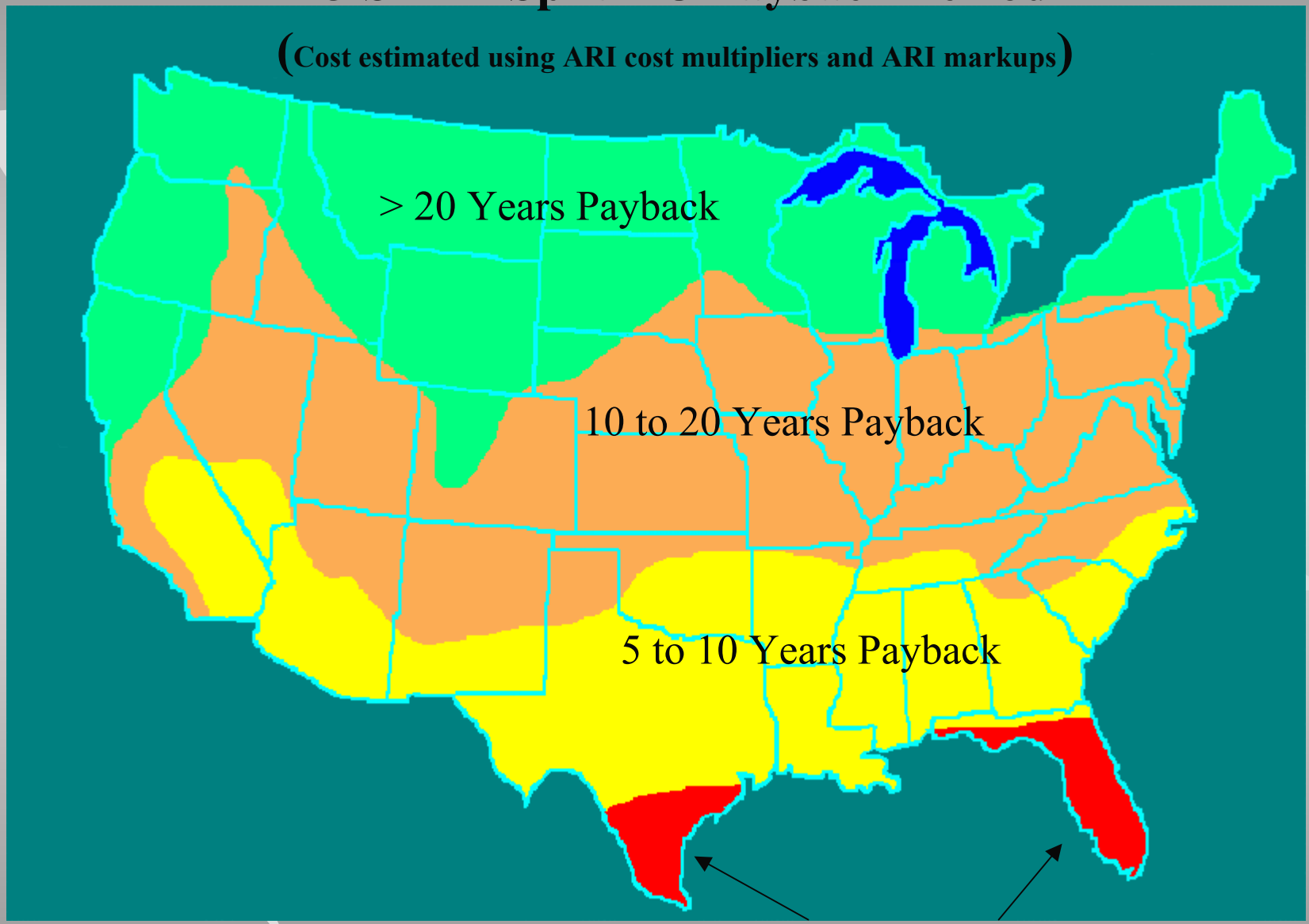
- Standard currently being revised
  - 13 SEER/7.7 HSPF proposed by the Clinton administration on 19 January 2001
  - 12 SEER/7.4 HSPF proposed by the Bush administration
  - Resulted in major courtroom battles
  - Industry initially supported 12 SEER/7.3 HSPF
  - Industry subsequently accepted 13 SEER/7.7 HSPF to ensure certainty in efficiency standard
  - Effective date of the standard: 5 years after the final rule

# Energy Efficiency Standards in the US

- Why 12 SEER?
  - Standard needs to be “technologically feasible and economically justifiable”
- Is 13 SEER technologically feasible? YES
- Is 13 SEER economically justified? NO
  - Reduce choice (84% of all ACs currently listed)
  - Cost $350 million to industry and $4 billion nationally
  - Paybacks between 5 and 22 years
  - 75% of consumers will not benefit

# 13 SEER Split AC Payback Period

(Cost estimated using ARI cost multipliers and ARI markups)



# Energy Efficiency Standards in the US

- Energy Policy Act (EPACT) established in 1992
- Sets federal minimum efficiency standards for commercial products
- Preempts state standards
- Efficiency standards are generally at the ASHRAE 90.1 levels
  - Unless there is “clear and convincing evidence” that higher levels are justified

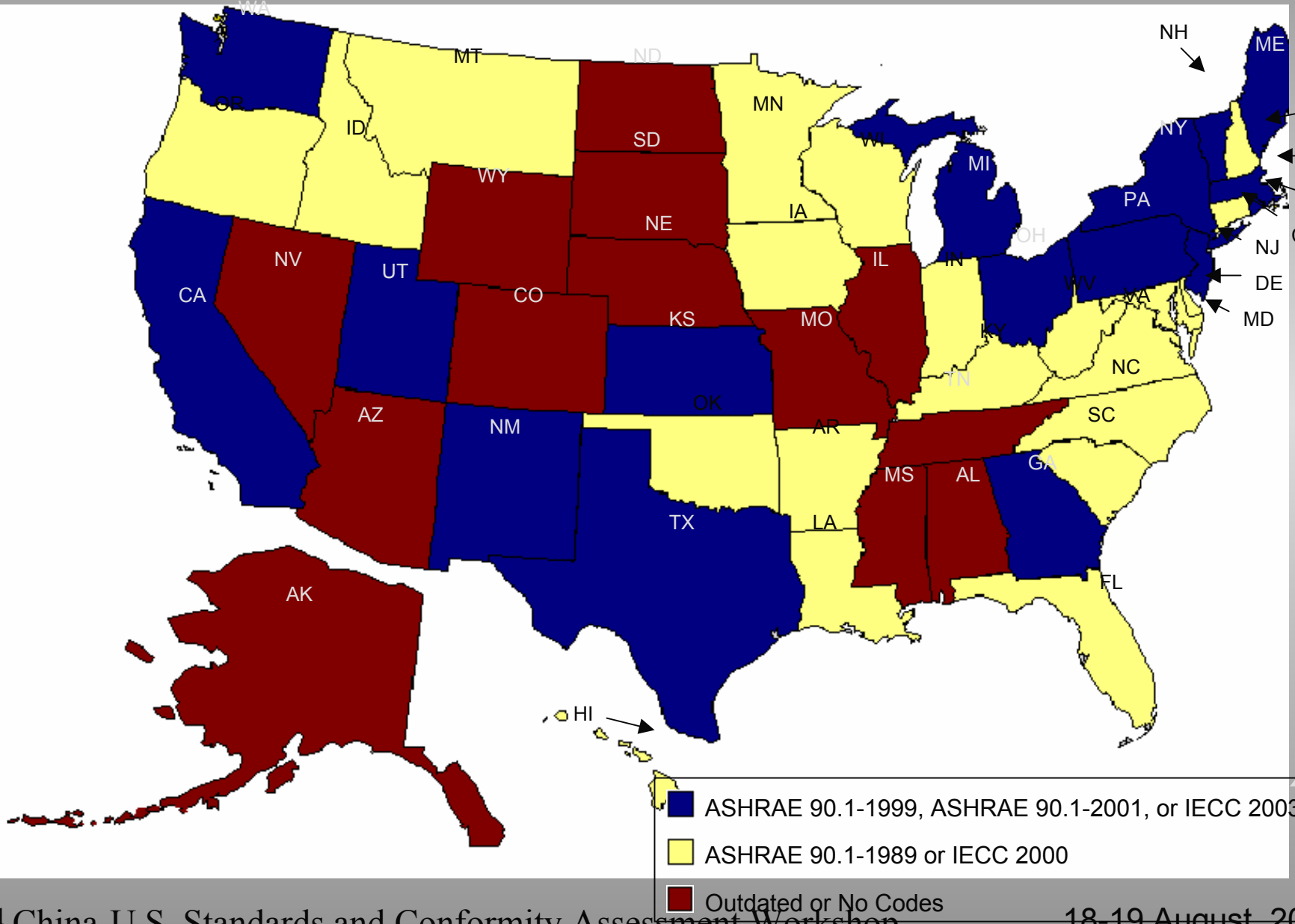
# Energy Efficiency Standards in the US

- ASHRAE 90.1 establishes minimum efficiency standards for most commercial and residential HVAC products
- ASHRAE 90.1 becomes law when states adopt them
- Prescribes certain design criteria and labeling requirements
- Written in code enforceable language
- Standard is on continuous maintenance

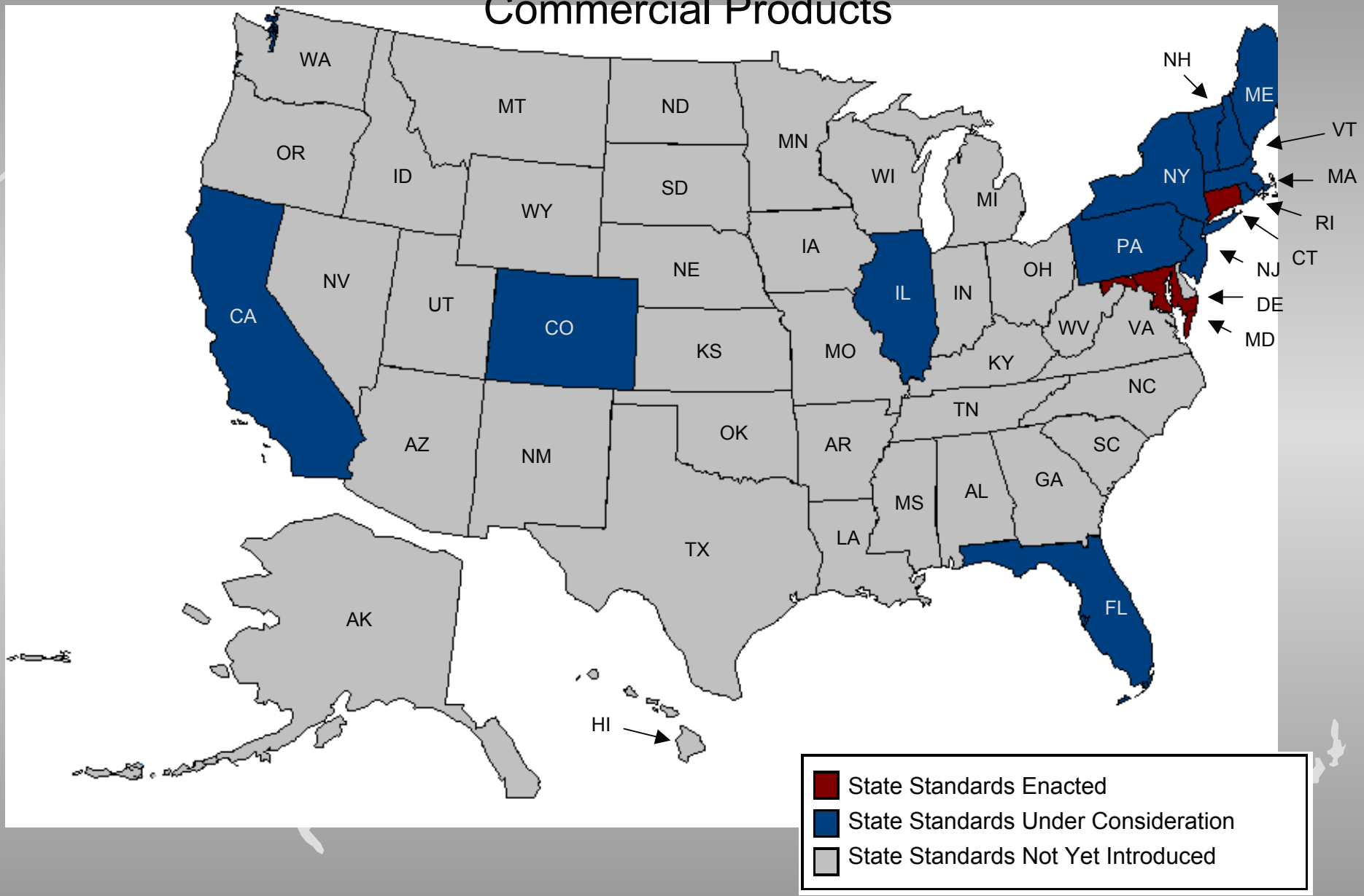
# Energy Efficiency Standards in the US

- States have authority to enact energy efficiency standards for those products that are not already federally covered
- Potential for a patchwork of state standards across U.S.
- Manufacturers are working with stakeholders to propose federal efficiency standards for products not covered under NAECA and EPACT

# ASHRAE 90.1/IECC State Adoption Map



# 2004 State Standards Activity for Large Commercial Products



# Energy Efficiency Standards in the US

- Illegal to vent a substitute for a CFC or HCFC refrigerant since 1995
- EPA requires that service technicians of air-conditioning and refrigeration equipment certify to EPA that they have acquired (built, bought, or leased) recovery or recycling equipment
- No mandate for reclaimed refrigerants

# Enforcement

- Declaration of compliance
- Means of providing new and revised energy efficiency ratings
- Labeling (Energy Guide) requirements showing ratings for consumers
- Verification testing with complaints
- Mandate certified recovery/recycling devices, technicians, but not reclaimed refrigerants
- Participation in industry voluntary certification programs

# Enforcement

- ARI Certification Requirements:
  - 30% of basic models tested per year
  - Certify-all
  - Random selection from stock
  - must achieve 95% of ratings for capacity & efficiency
  - Forced re-rate or obsolete upon failure
  - Monetary penalties for repeated re-rates
  - All costs borne by manufacturers
  - Directory of certified ratings published on-line in real time

# Conclusions

- Era of relative inexpensive energy is over
- Standards have the potential to be a major contributor to energy savings
- There are a lot of considerations and stakeholders
  - Industry, government, professionals, advocates, states
- Participation of all stakeholders and balance of interest
- Standards should be:
  - Technologically feasible and economically justifiable
  - Innovative and not discourage technological advancement
- Global market and competition will demand product differentiation and standards will be the measuring stick