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Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency
An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLIT, New Delhi





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THIS PRESENTATION WAS SHARED BY

William Prindle

ICF

FOR THE SESSION:

“Policy Framework for Energy Efficiency in Buildings (Codes and Standards)”

DURING ANGAN 2019

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Market Transformation Tales: Policy Implementation in the Buildings Sector

Bill Prindle
Vice President

ANGAN Conference
September 9, 2019



Overview

- **The challenges to market transformation in the buildings sector**
- **A market transformation framework for overcoming challenges**
- **Three U.S. market transformation stories: refrigerators, residential building codes, and residential windows.**

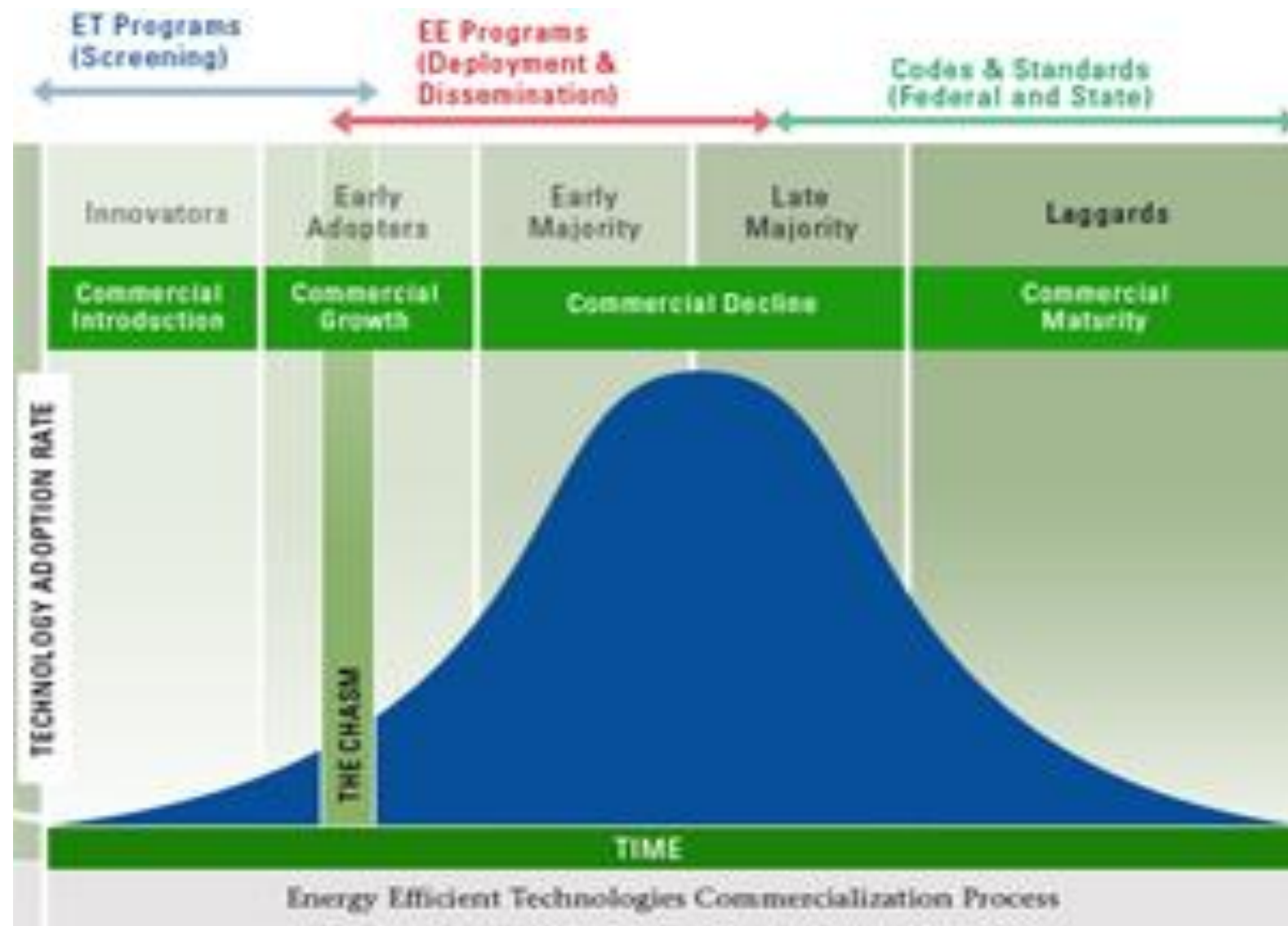


Market Transformation Challenges

- **Size and diversity of building stock**
 - 100+ million buildings and growing
 - Widely diverse building types and ownership structures
 - Multiple markets—new construction, equipment replacement, optional retrofit
- **Small scale of energy end use decisions**
 - Millions of decisions by diverse parties on varying timeframes
 - Creates an endemic transaction-cost problem
- **The split incentive/principal-agent problem**
 - Especially affects new construction and rental markets

Market Transformation Framework: Linear or Cyclical?

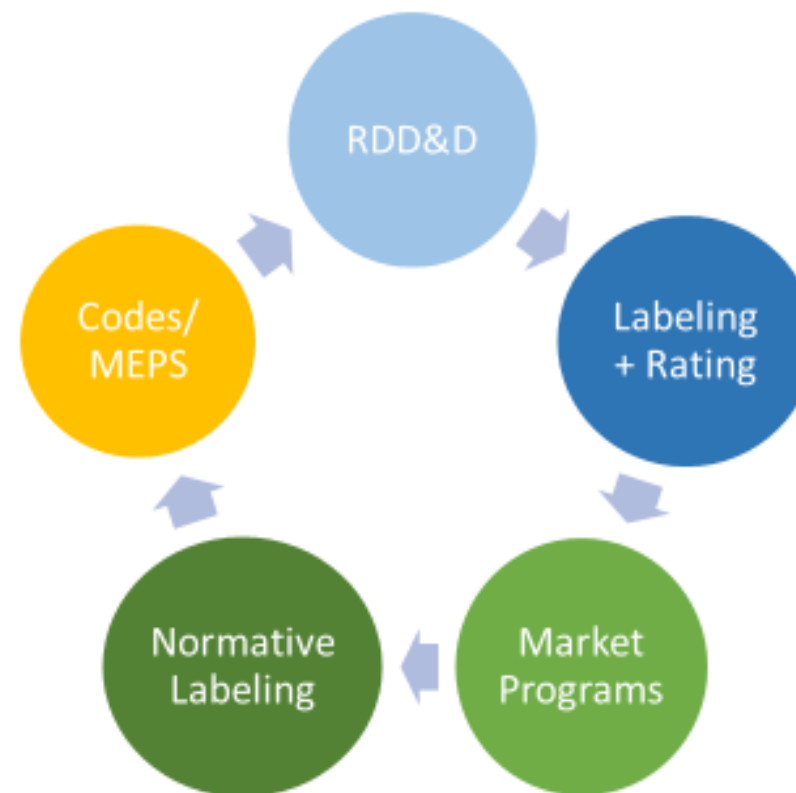
A linear process model



Market Transformation as Cyclical Process

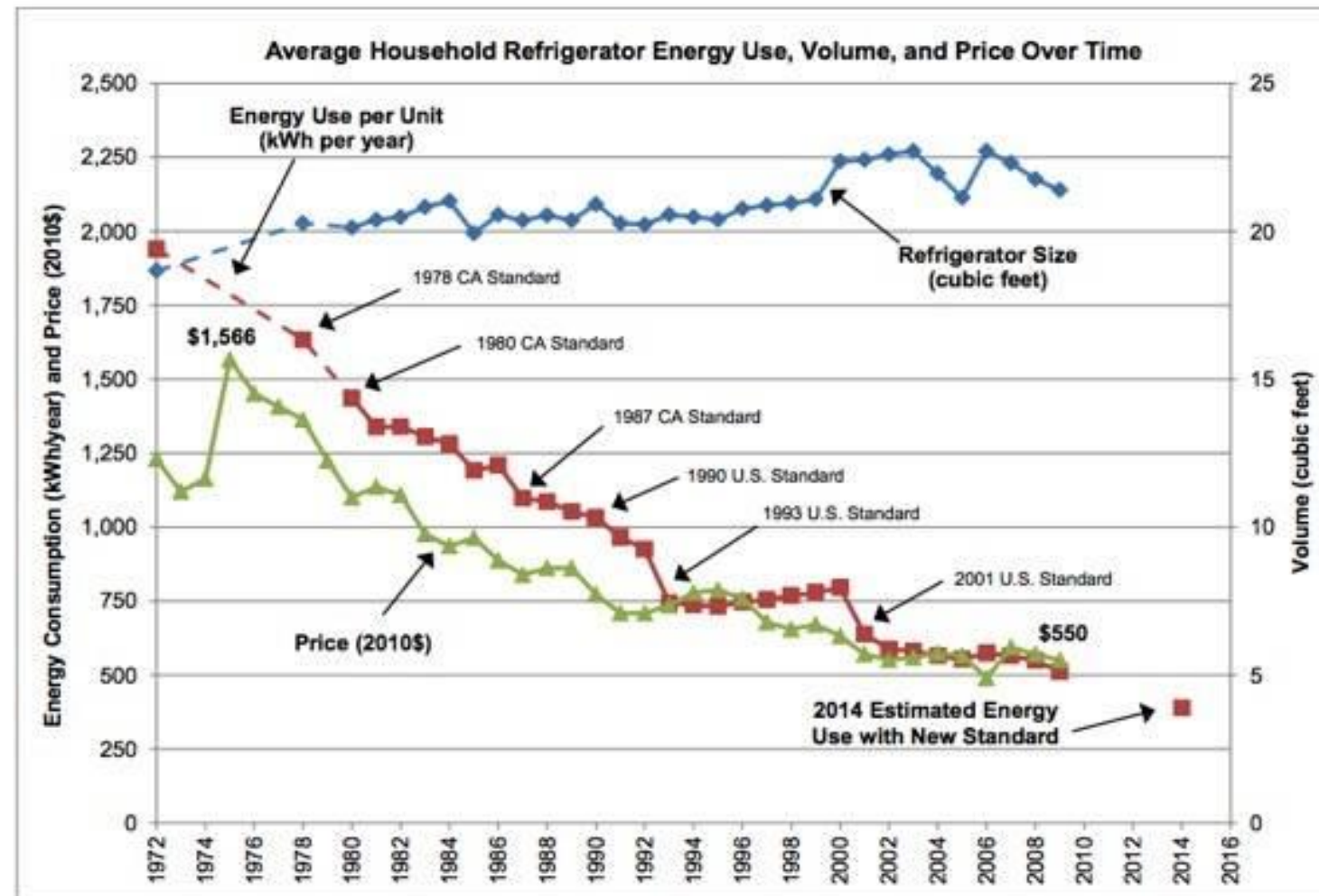
The
cyclical
model
includes
RD&D
and other
elements

The Market Transformation Cycle



MT Story 1: U.S. Refrigerators

ASAP | APPLIANCE STANDARDS AWARENESS PROJECT



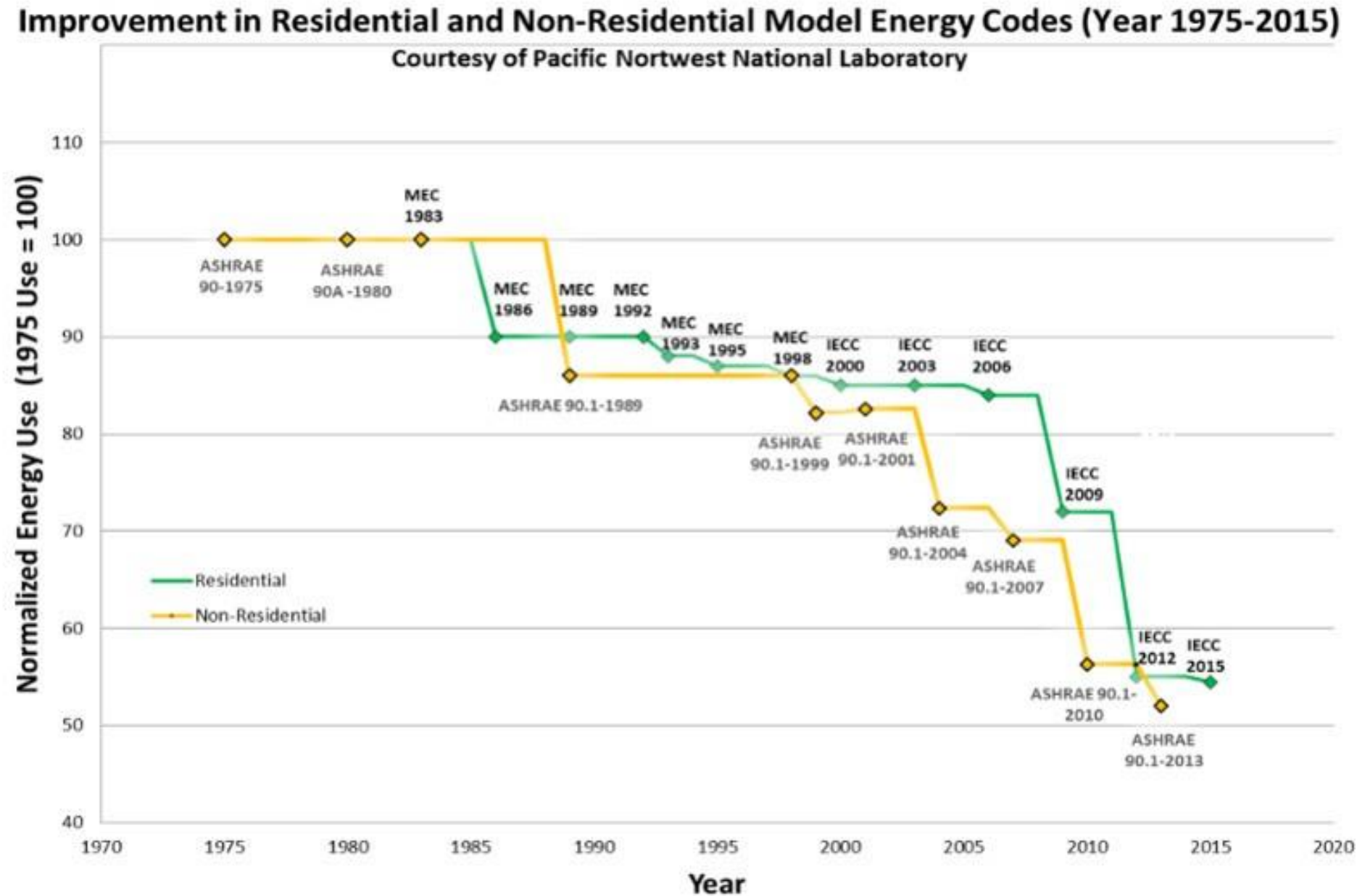
Sources: Association of Home Appliance Manufacturers (AHAM) for energy consumption and volume; U.S. Census Bureau for price

- Notes:**
- a. Data includes standard-size and compact refrigerators.
 - b. Energy consumption and volume reflect the DOE test procedure published in 2010.
 - c. Volume is adjusted volume, which is equal to the fresh food volume + 1.76 * freezer volume.
 - d. Prices represent the manufacturer selling price (e.g. excluding retailer markups) and reflect products manufactured in the U.S.

The Refrigerator Story

- **1970s: FTC Energy Guide labeling**
- **1980s: DOE R&D on advanced compressors and other features**
- **Early 1990s: “Golden Carrot” competition**
- **Mid-1990s: Utility DSM promotion of efficient refrigerators**
- **Mid-1990s: ENERGY STAR refrigerator specification**
- **1997: Negotiated DOE MEPS standard**
- **2001: new DOE standard effective date**
- **2001+: Further market transformation via ENERGY STAR specs, DOE standards, stakeholder collaborations**

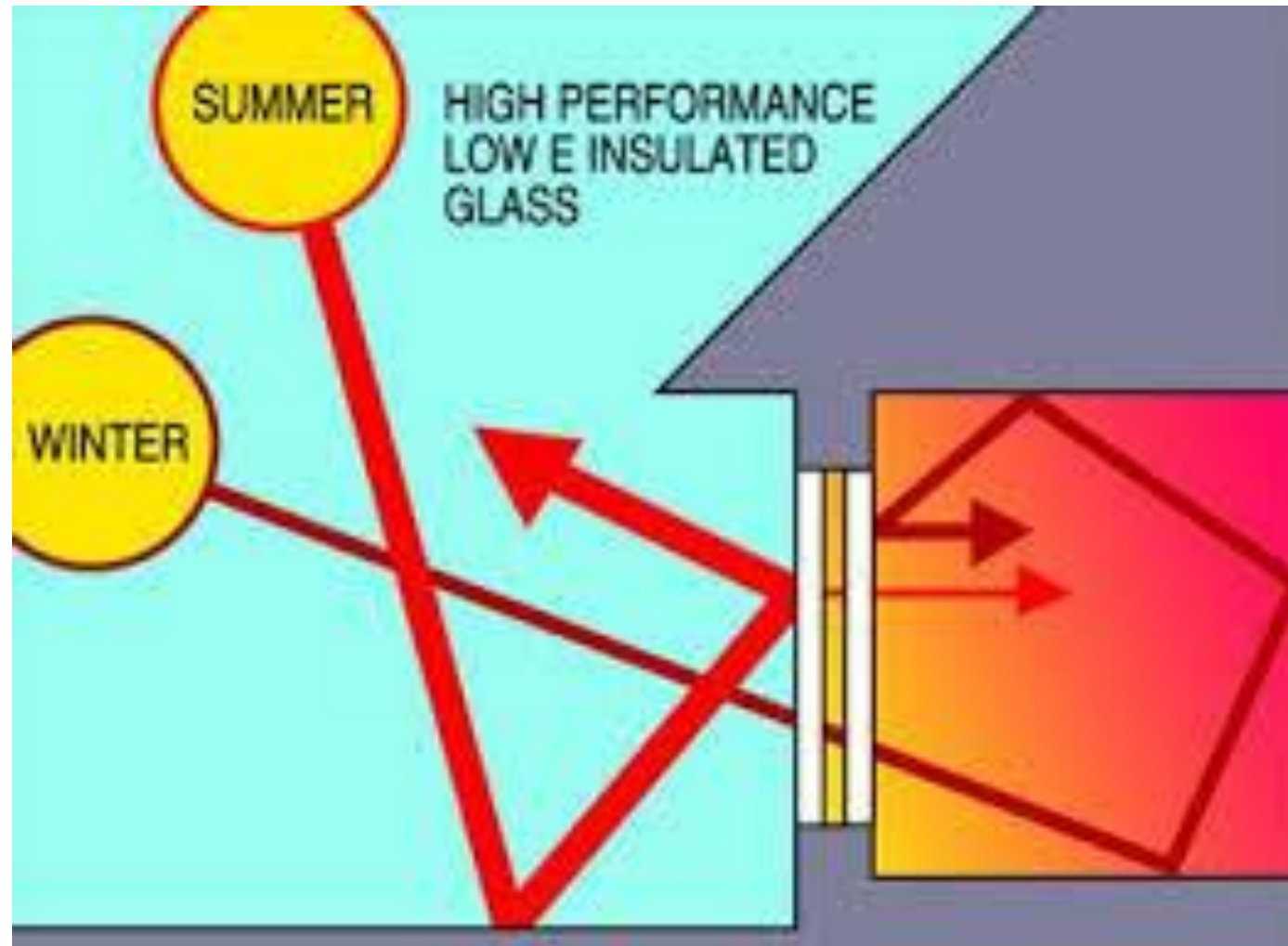
MT Story 2: U.S. Energy Codes



The U.S. Residential Energy Codes Story

- **1970s: National Building Energy Performance Standards (BEPS)**
- **1980s: Congress repeals BEPS**
- **1980s: Model Energy Code (MEC); adoption by states is voluntary**
- **1992: Energy Policy Act of 1992 places mandates on states**
- **1994: Building Codes Assistance Project (BCAP) and DOE's codes technical assistance program launched**
- **1990s:**
 - most states “notify” MEC versions, MEC becomes IECC
 - ENERGY STAR Homes gains market share; utility programs offer incentives.
- **2000s:**
 - 2009 and 2012 IECC residential standards improve, adopting ENERGY STAR technologies.
 - RESNET drives voluntary HERS ratings.
 - 2015 IECC adds RESNET-based Energy Rating Index (ERI) compliance path.

MT Story 3: U.S. Residential Windows



ENERGY STAR® Certified in Highlighted Regions

World's Best Window Co.
 Millennium 2000+
 Vinyl-Clad Wood Frame
 Double Glazing • Argon Fill • Low E
 Product Type: **Vertical Slider**
 (per NFRC 100-97)

ENERGY PERFORMANCE RATINGS

L-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.27	0.30

ADDITIONAL PERFORMANCE RATINGS

Visible Transmittance	Air Leakage (U.S./I-P)
0.51	≤0.3

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org

The U.S. Residential Windows Story

- **1980s: DOE research on low-emissivity coatings**
- **1990s: EPA Act 1992 requires rating and labeling system, National Fenestration Rating Council (NFRC) is formed**
- **1990s: NFRC test methods and labeling mandatory in Model Energy Code.**
- **Late 1990s: ENERGY STAR Windows program launched, also based on the NFRC rating and labeling scheme.**
- **2000s: ENERGY STAR Windows criteria applied in IECC versions, matching code and voluntary standards in some states. U-factor and SHGC criteria continue to improve in subsequent code versions.**



Key Lessons Learned

- **Think long-term**
- **Think outside policy silos**
- **Leverage voluntary programs**
- **Cultivate market leaders**



Contact information

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Thank you!