

ASHRAE Region XIII 18th Chapters Regional Conference (CRC)  
Student Seminar-Workshop  
21 Aug 2015 (Fri), at Asian Institute of Management, Makati, Philippines



# Careers in HVAC&R and Updates on ASHRAE

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Regional Vice Chair – Student Activities

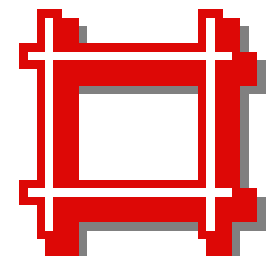
ASHRAE Region XIII

Aug 2015

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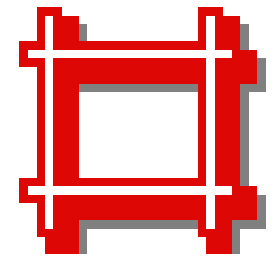


# Introduction

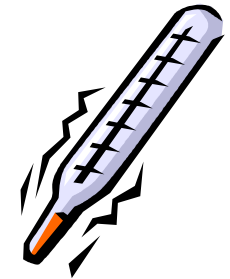
- What is HVAC&R?
  - HVACR is an acronym or abbreviation for the products and services related to the functions of:
  - **H**eating
  - **V**entilation
  - **A**ir-**C**onditioning
  - **R**efrigeration



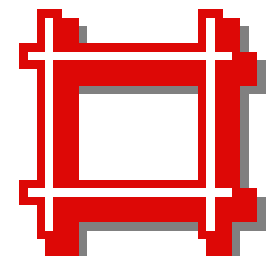
# Introduction



- HVACR involves a lot more than just temperature...
- It impacts:
  - The indoor air that we breathe
  - Moisture levels & potential mold growth
  - The amount of energy used and money it costs to cool or heat buildings and indoor environment
- Our health and comfort!





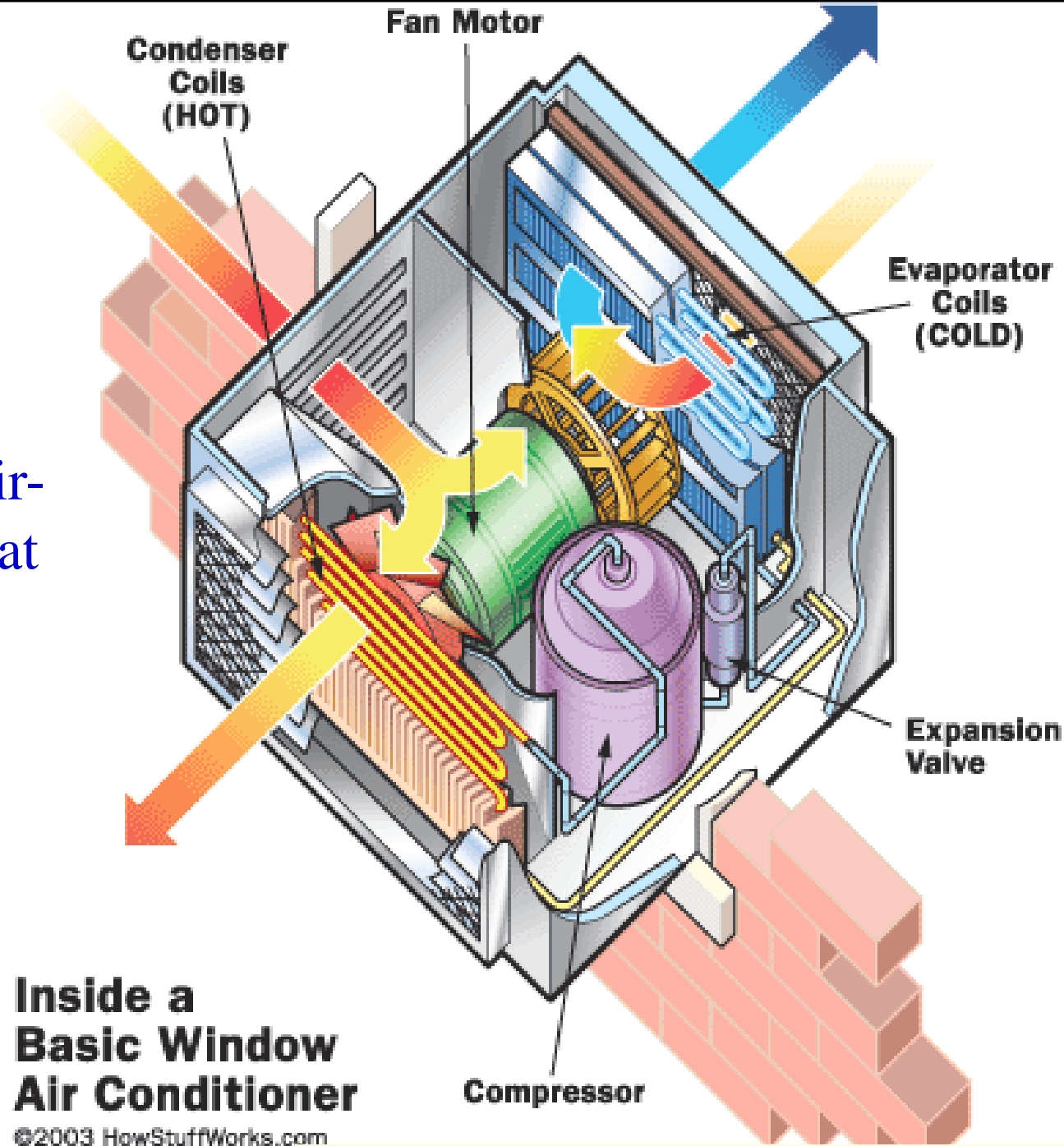


# Introduction

- Applications of HVAC&R:
  - Industrial sector
    - e.g. textile mills, electronics, pharmaceutical
  - Commercial sector
    - e.g. offices, hotels, retails
  - Residential sector
    - e.g. apartments, houses
  - Transport sector
    - e.g. aircrafts, buses, private cars, trains



Check the air-conditioner at your home.



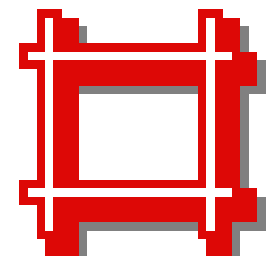
See also: “How Air Conditioners Work” (1:07)

<http://youtu.be/nKZ2DPvvua8>



# The HVACR Industry

The **HVACR industry** is critical to ensuring human comfort, preserving food supplies, medical/research processes, energy efficiency and environmental sustainability



# Introduction

- HVAC&R industry's major roles:
  - Equipment manufacturing
  - Sales and marketing
  - Distribution
  - System design
  - Construction
  - Operation and maintenance
  - Education and research





# Careers in HVAC&R

- HVAC&R Engineers and Technicians
  - Job duties include design, installation, maintenance, and repair of HVAC&R systems
    - For residential, industrial, institutional, and commercial buildings, including schools, office buildings, and health care facilities
    - Design new systems or find solutions for existing system problems
  - Can work for consulting/design firms, contractors, government agencies, utilities, facilities offices, or equipment sales offices





# Careers in HVAC&R

- Videos:
  - Careers in the HVACR and Water Heating Industry (2:40)  
[www.youtube.com/watch?v=crMPmGUNgsY](http://www.youtube.com/watch?v=crMPmGUNgsY)
  - Choose a Career in the HVACR Industry (1:29)  
[www.youtube.com/watch?v=bFDEkDYpJx8](http://www.youtube.com/watch?v=bFDEkDYpJx8)





# Careers in HVAC&R

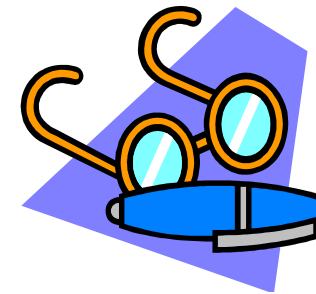
- Required education:
  - Entry-level HVAC&R Engineer jobs
    - A bachelor degree in HVAC&R, mechanical engineering, building services engineering, or architectural engineering
  - Technician jobs
    - A higher diploma, diploma or associate degree in relevant engineering technologies
  - Apprenticeship
    - Vocational technical training



# Careers in HVAC&R



- Skills required:
  - Problem solving
  - Attention to detail
  - Integrity and dependability
  - Mechanical aptitude
  - Computer and technology
  - CAD software
  - Communication skills
  - Concern for the environment





# Careers in HVAC&R

- People who enjoy the following should investigate a career in HVAC&R:
  - Figuring out how things work
  - Working with their hands or with tools
  - Diagnosing & solving problems
  - Using computers & technology
  - Working independently



# Updates on ASHRAE



*Shaping Tomorrow's Built Environment Today*



# About ASHRAE

- **ASHRAE** = American Society of Heating, Refrigerating and Air-Conditioning Engineers
- Founded in 1894, a global society advancing human well-being through sustainable technology for the built environment
- Focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability





# About ASHRAE

- 2012 ASHRAE Rebranding:
  - A refreshed logo
  - A new tagline (*Shaping Tomorrow's Built Environment Today*)
  - A change to using only its acronym



(Logo created in 1959)



(Refreshed logo 2012)

# About ASHRAE

A thick, horizontal yellow brushstroke with a textured, painterly appearance.

- What Makes Us Different
  - Technical foundation built by *volunteer* members
  - One of few HVAC&R organizations in world with own *research* program
  - Encourages *participation* from people all over the world
- Power of Chapters



• ASHRAE can share the knowledge by bringing members together via chapters --- to build the community of HVAC&R

# About ASHRAE

- Nine Chapters in ASHRAE Region XIII:

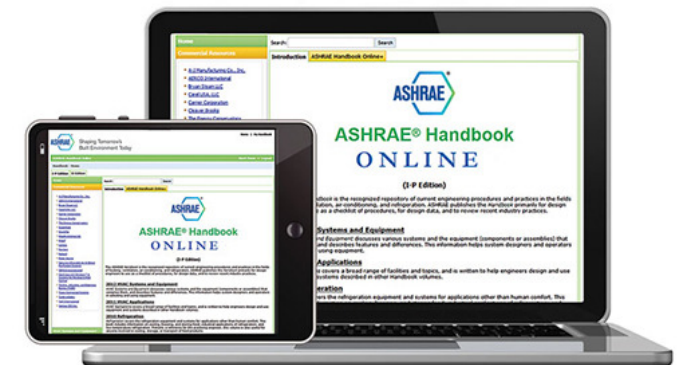
- Hong Kong
- Indonesia
- Japan
- Malaysia
- Philippines
- Singapore
- South Korea
- Taiwan
- Thailand





# ASHRAE Publications

- ASHRAE Handbooks (four volumes, one of them is updated each year)
  - Fundamentals
  - HVAC Applications
  - HVAC Systems and Equipment
  - Refrigeration
- Now in different versions:
  - Printed
  - CD and online





# ASHRAE Publications

- **Important ASHRAE Standards (latest update)**
  - 15-2013, Safety Standard for Refrigeration Systems
  - 55-2013, Thermal Environmental Conditions for Human Occupancy
  - 62.1-2013, Ventilation for Acceptable Indoor Air Quality
  - 90.1-2013, Energy Standard for Buildings Except Low-Rise Residential Buildings
  - 100-2015, Energy Conservation in Existing Buildings
  - 170-2013, Ventilation of Health Care Facilities
  - 188-2015, Legionellosis: Risk Management for Building Water Systems
  - 189.1-2014, Standard for the Design of High-Performance Green Buildings
  - 203-2014, Commissioning Process for Buildings and Systems



# ASHRAE Publications

- **Guidelines**

- 0-2013, The Commissioning Process
- 4-2008 (RA 2013), Preparation of Operating and Maintenance Documentation for Building Systems
- 13-2015, Specifying Direct Digital Control Systems
- 14-2014, Measurement of Energy and Demand Savings
- 32-2012, Sustainable High Performance Operation and Maintenance

- **Magazines and Research Journal**

- ASHRAE Journal
- High Performance Building (HPB) Magazine [www.hpbmagazine.org](http://www.hpbmagazine.org)
- Science and Technology for the Built Environment (formerly HVAC&R Research), ASHRAE's journal of archival research



# ASHRAE Publications

- **Design Guides/Manuals (latest ones)**
  - Active and Passive Beam Application Design Guide, 2014
  - ASHRAE Design Guide for Tall, Supertall, and Megatall Building Systems, 2015
  - ASHRAE GreenGuide (4th ed.), 2013
  - Combined Heat and Power Design Guide, 2015
  - Data Center Design and Operation: ASHRAE Datacom Series
  - District Cooling and Heating Guides, 2013
  - Energy Efficiency Guides for Existing Commercial Buildings, 2012
  - Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems, 2015
  - HVAC Design Manual for Hospitals and Clinics (2nd ed.), 2013
  - UFAD Guide (2nd ed.), 2013

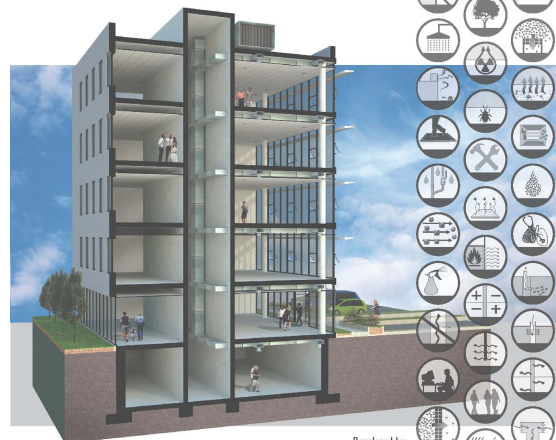


# ASHRAE guide books

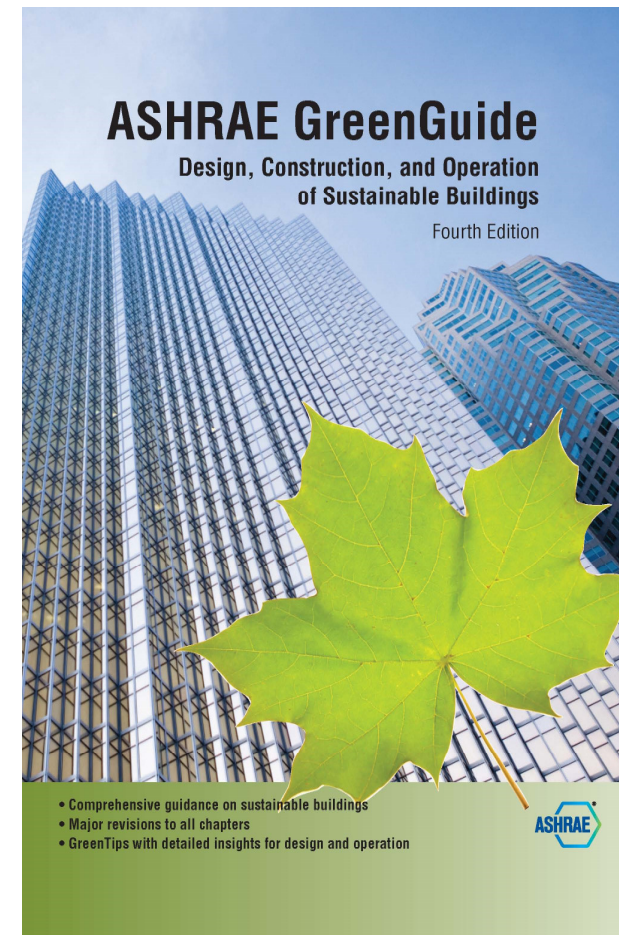


## Indoor Air Quality Guide

Best Practices for Design, Construction, and Commissioning



Developed by:  
 American Society of Heating, Refrigerating and Air-Conditioning Engineers  
 The American Institute of Architects  
 Building Owners and Managers Association International  
 Sheet Metal and Air Conditioning Contractors' National Association  
 U.S. Environmental Protection Agency  
 U.S. Green Building Council





# ASHRAE Publications

- Free resources, such as:
  - Advanced Energy Design Guides
    - [www.ashrae.org/freeaedg](http://www.ashrae.org/freeaedg)
  - Indoor Air Quality Guide
    - [www.ashrae.org/FreeIAQGuidance](http://www.ashrae.org/FreeIAQGuidance)
  - Refrigeration Commissioning Guide
    - [www.ashrae.org/freeRefCxGuidance](http://www.ashrae.org/freeRefCxGuidance)
  - Procedures for Commercial Building Energy Audits
    - [www.ashrae.org/pcbea](http://www.ashrae.org/pcbea)
  - ASHRAE Green Standard 189.1
    - [www.ashrae.org/greenstandard](http://www.ashrae.org/greenstandard)



# Recent Developments

- Indoor Air Quality Association (IAQA [www.iaqa.org](http://www.iaqa.org)) has become part of ASHRAE, while maintaining own brand and Board of Directors
- To join forces, combining resources to improve IAQ and to strengthen programs and services of both organizations

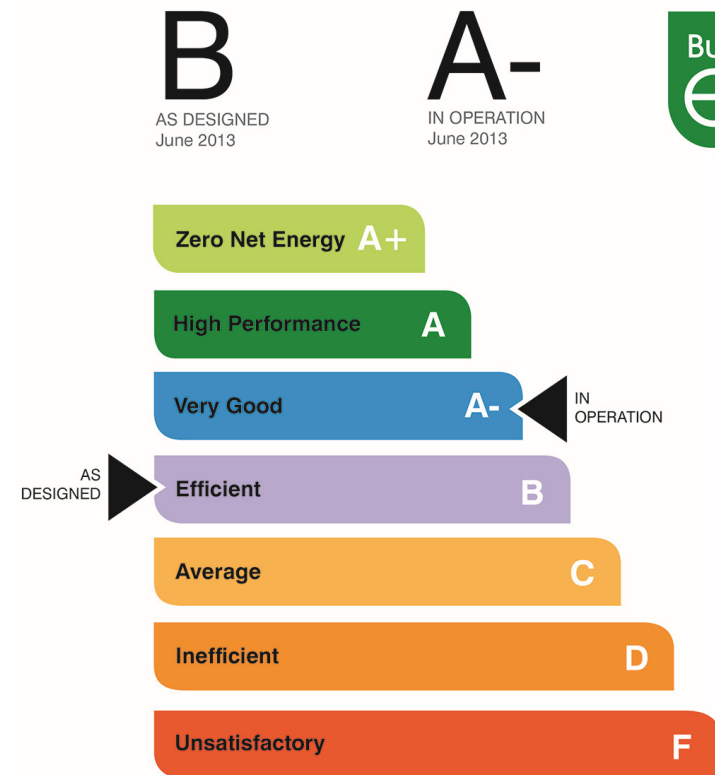






# Recent Developments

- ASHRAE's Building Energy Labeling Program, bEQ
  - As Designed
  - In Operation
- Information
  - bEQ Workbook
  - bEQ Certificate
  - bEQ Dashboard
  - bEQ Plaques



ASHRAE bEQ administered by ASHRAE  
www.buildingenergyquotient.com

## BUILDING ENERGY QUOTIENT

As Designed: Indicates the estimated energy consumption of this building as designed.  
In Operation: Indicates the energy consumption of this building in actual use.

Building Location:  
Sample Building  
1000 Any Street  
Anytown, USA 10000

# ASHRAE 90.1 (building energy standard) compliance approaches

[New version 90.1-2016 will come soon]

## Building System

## Compliance Options

Envelope

HVAC

SWH

Power

Lighting

Other

**Mandatory Provisions**  
(required for most compliance options)

Prescriptive Option

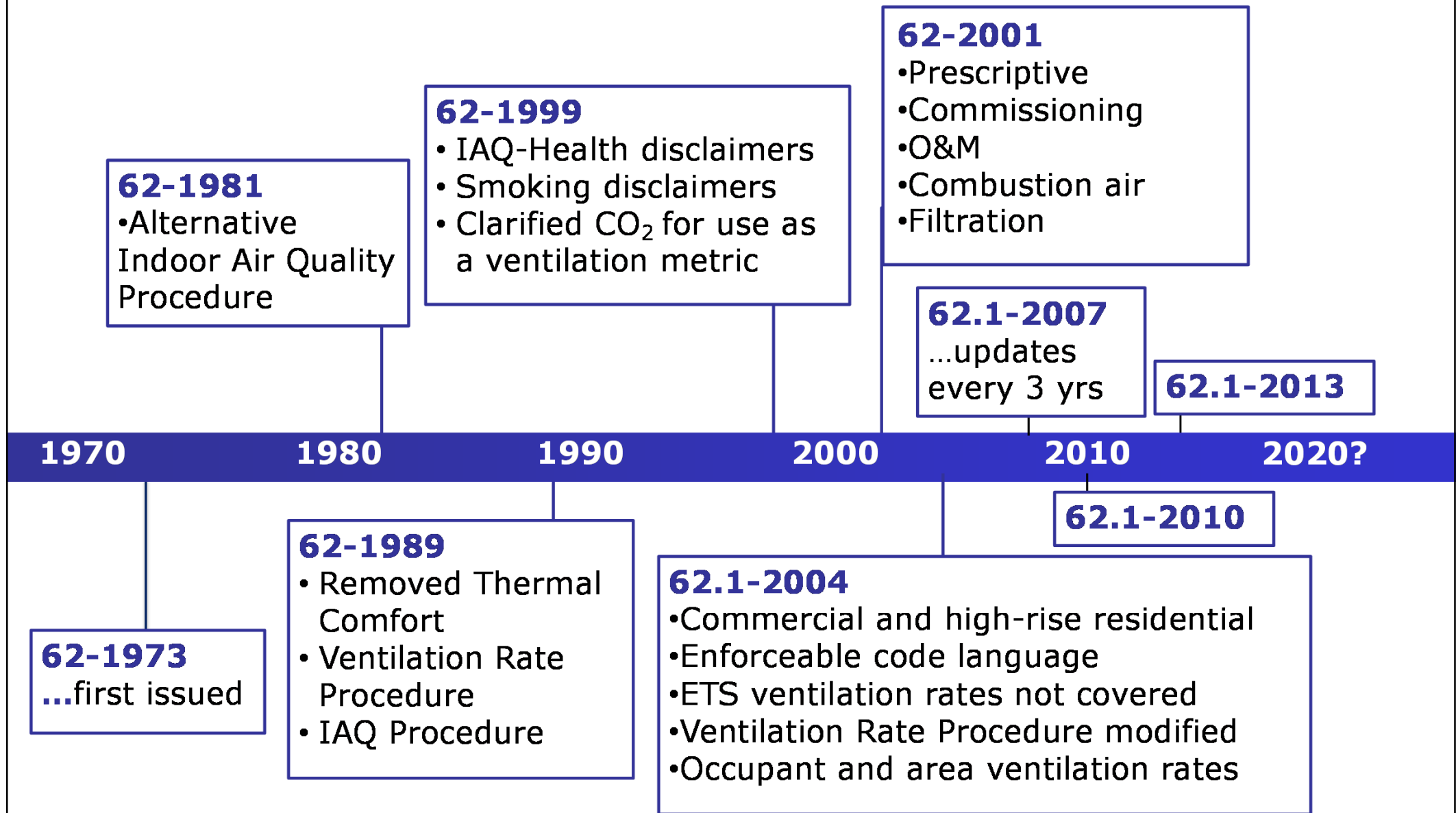
Trade Off Option

Energy Cost Budget

Simplified

Energy Code Compliance

# History of ASHRAE Standard 62.1 (indoor air quality)



# ASHRAE Standard 189.1 Preview

[www.ashrae.org/greenstandard](http://www.ashrae.org/greenstandard)



**Knowledge is power.  
Understanding is power<sup>2</sup>.**



# Thank You

Danke Schoen

Gracias!

THANKS

謝謝

Tak!

ارکش

ありがとう

GRAZIE

Merci!

salamat

Thanks

감사합니다 謝謝

gracias