DAVE DELAQUILA, PRESIDENT, AQUILA CONSULTING, LLC

DAVE DELAQUILA HAS 31 YEARS OF ACCUMULATED EXPERIENCE AND PARTICIPATION IN NATIONAL, REGIONAL, AND INTERNATIONAL STANDARDS DEVELOPMENT. HE IS A GRADUATE OF YOUNGSTOWN STATE UNIVERSITY IN OHIO AND AUGSBURG COLLEGE IN MINNEAPOLIS, MN. SINCE 2001, BEFORE STARTING HIS OWN CONSULTING BUSINESS IN 2014, DAVE HAS WORKED FOR THE FORMER CSA GROUP (AGA LABS), HONEYWELL INTERNATIONAL, THE GAS APPLIANCE MANUFACTURERS ASSOCIATION (GAMA) AND MORE RECENTLY THE AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI). HE HAS IN-DEPTH KNOWLEDGE OF HVAC APPLIANCE STANDARDS, VENTILATION AND CONTROLS, AND A STRONG COMMITMENT TO THE OPEN STANDARDS PROCESSES AND PROCEDURES. DAVE IS A MEMBER OF SEVERAL ANSI ACCREDITED Z21/CSA APPLIANCE TECHNICAL SUBCOMMITTEES AND SERVES AS CHAIRMAN OF THE ANSI Z21/CSA AUTOMATIC GAS CONTROLS TECHNICAL SUBCOMMITTEE. HE IS A LONG-STANDING MEMBER OF ANSI, ASHRAE, THE INTERNATIONAL STANDARDS ORGANIZATION (ISO), THE INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC), AND IN 2014, RECEIVED THE PRESTIGIOUS *IEC 1906 AWARD*, FOR OUTSTANDING CONTRIBUTION.

AMERICAN SOCIETY OF GAS ENGINEERS (ASGE)

TECHNICAL CONFERENCE, LAS VEGAS, JUNE 7, 2022

DAVE DELAQUILA
TECHNICAL STANDARDS CONSULTANT
AQUILA CONSULTING, LLC

Assault on Gas-Fired Heating and Fossil Fuels

ASHRAE – *(AKA) American Society of Heating, Refrigerating and Air-conditioning Engineers*

- Overview: Who, What, How, Why
- Will Cover Standing Standards Project Committees (SSPC)
  - *90.1 - Energy Standard for Buildings High-Rise Residential*
  - *90.2 - Energy-Efficient Design of Low-Rise Residential*
  - *189.1 - High-Performance Green Buildings [IgCC]*
  - *62.2 - Ventilation for Acceptable Indoor Air Quality*
  - *228P - Evaluating Zero Net Energy and Zero Net Carbon*
  - *Other - Cooking / Ranges / Ovens / Stoves*

ASHRAE

- **Mission:** “To serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.”

- **Vision:** “A healthy and sustainable built environment for all.”

- **How:** By facilitating and administering the development of open, consensus-based standards. To manage and support that vision, ASHRAE is an ANSI* accredited standards developing organization (SDO), and as such it is required to operate using procedures that ensure due process and that allow for openness, equity, and fair play.

*American National Standards Institute

MEMBER SERVICES

ASHRAE CONFERENCES

Society

- 2021 Virtual Winter Conference
- 2021 Virtual Annual Conference

2 SOCIETY

Topical

- 2020 Building Performance Analysis Conference and SimBuild co-organized by ASHRAE and IBPSA-USA (virtual)
- 4th International Conference on Efficient Building Design: Material & HVAC Equipment Technologies (virtual)
- 2021 Virtual Design and Construction (virtual)

3 TOPICAL

15 CRCs

All Virtual

199 TOTAL CHAPTERS

450 ACTIVE STUDENT BRANCHES

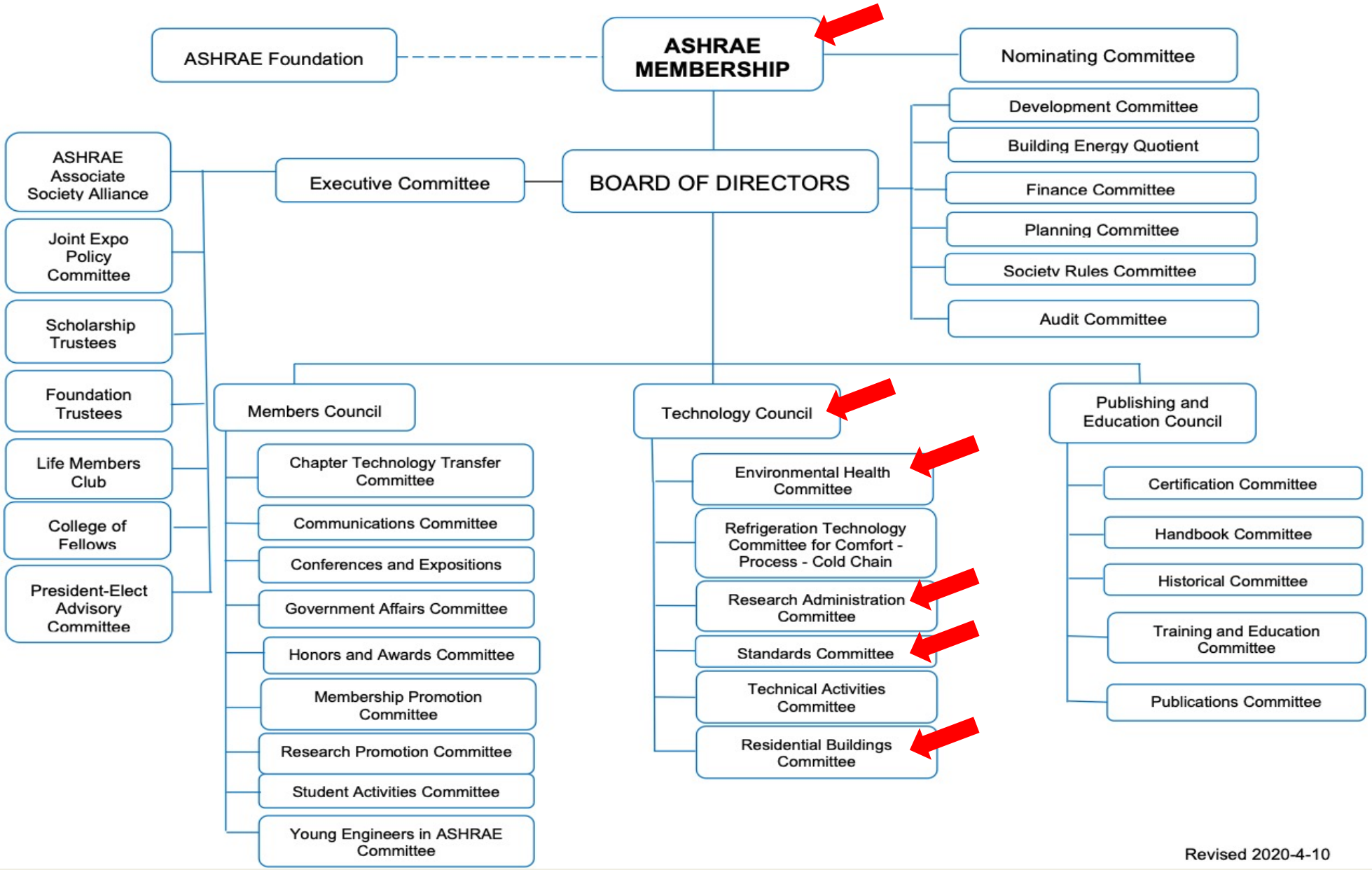
51,358 TOTAL SOCIETY MEMBERS

280 DISTINGUISHED PRESENTATIONS (All Virtual)

2 TECH HOURS

1,527 VIEWS

ASHRAE STRUCTURE



Revised 2020-4-10

ASHRAE

Technology Council reports to the Board of Directors.

- Environmental Health Committee coordinates ASHRAE activities in the areas of environmental health and indoor air quality.
- Standards Committee is responsible for the selection, development, revision and preparation of HVAC&R code language documents, standards and guidelines for adoption by the BOD. Also coordinates the work of *Standard Project Committees* responsible for the technical content of codes and standards.
- Research Administration Committee conducts and coordinates basic research and technical studies in the HVAC&R fields to benefit the public welfare.
- Residential Buildings Committee is responsible for identifying major residential trends impacting the practice of HVAC&R and making recommendations on new activities The committee also coordinates relationships with other societies and organizations that focus on residential buildings.

ASHRAE Technical and Project Committees

Standards Committee reports to Tech Council

- 89 Technical Committees (TCs)
  - *Heating, A/C, Refrigeration, Refrigerants, Ventilation, Lighting, Fenestration, Motors, Fans, Etc.*
- 30 Standing Standards Project Committees (SSPC) *(Continuous maintenance)*
  - *Many have Subcommittees or Working Groups*
- 50 Standards Project Committees (SPC) *(Limited time)*
- 13 Guideline Project Committees (GPC)

ASHRAE Position Documents

Includes (11 in all):

- *Climate Change*
- *Unvented Combustion Devices and IAQ*
- *Indoor Air Quality*
- *Indoor Carbon Dioxide (New Feb 2022)*
- *Resiliency in the Built Environment*
- *Energy Efficiency in Buildings*

https://www.ashrae.org/about/position-documents

ASHRAE Technical and Project Committees

Balanced Committee Memberships (*However?*)

- *Research Laboratories*
- *Academia*
- Government (DOE, EPA)
- Manufacturers / Industry
- Builders / Designers
- Utility
- Users (owners, operators, consumers)

ASHRAE SSPC 90.1

1. TITLE

Energy Standard for Buildings Except Low-Rise Residential Buildings (Three stories or fewer above grade)

2. PURPOSE

To establish the minimum energy efficiency requirements of buildings other than low-rise residential buildings for

a. design, construction, and a plan for operation and maintenance; and
b. utilization of on-site, renewable energy resources.

3. SCOPE

Provides criterial for determining compliance in new buildings and new portions thereof and their systems. New equipment and systems in existing buildings, as well as those specifically identified as part of industrial or manufacturing processes. Does not apply to manufactured homes.

ASHRAE SSPC 90.1

WHY IS IT IMPORTANT?

DOE Regulatory Authority for Energy Efficiency Standards for Commercial Equipment (e.g., Water and Space Heating)

- For decades DOE has used 90.1 to determine the minimum efficiency levels for heating and cooling equipment in its rulemakings for commercial products.
- State and federal governments also reference it as a base construction code for government buildings and construction projects.

ASHRAE SSPC 90.1

CURRENT CONCERNS!

- Current proposal being developed that would use an all-electric building as a baseline for comparison purposes.
- Well run and generally fair Committee, but… *strong influences help steer the direction (e.g., EEI)*
- Other

ASHRAE SSPC 90.2

1. TITLE

Energy-Efficient Design of Low-Rise Residential Buildings

2. PURPOSE

The purpose of this standard is to establish the minimum whole-building energy performance requirements for energy efficient *residential buildings*.

3. SCOPE

This standard provides the minimum design, construction, and verification requirements for new residential buildings and their systems and new portions of existing residential buildings and their systems that use renewable and non-renewable forms of energy. One- and two-family, multifamily three stories or fewer above grade and outbuildings.

- *[Undergoing an extensive revision. Wants to reach into new areas (IEQ, other ?)]*

ASHRAE SSPC 90.2

WHY IS IT IMPORTANT?

Driver is the *Natural Resource Defense Council (NRDC)*. New Chairman. Very much in favor of “electrification.”

- *Relatively new activity to re-introduce this standard for residential dwellings.*
- *Previously unused in favor of the International Energy Conservation Code (IECC).*
- *Considered the “stretch” standard to IECC, and*
- *Claims 50% more efficient.*

ASHRAE SSPC 90.2

CURRENT CONCERNS!

- *Looking to modify its Title, Purpose and Scope to address "high levels" of energy performance and regulate greenhouse gas emissions.*
- *TPS Proposal in Addendum "c" expected to go out for public review*
- *Intended to be a "stretch code" to the IECC.*
- *Early proposal introduced by 62.2 members to ban unvented heaters.*
  - *Proposal On-hold - Pending outcome of addendum "j" to Std 62.2*
  - *Curious that energy efficient residential building "stretch" standard would ban highly efficient space heat option.*
- *Focused on Electrification (Site energy).*
- *Intended to replace IECC*

ASHRAE SSPC 189.1

1. TITLE

Standard for the Design of High-Performance Green Buildings & via MOU with ICC became

☞ *ICC – International Green Construction Code (IgCC)*

2. PURPOSE (Serves as technical content to IgCC)

The purpose of this standard is to provide minimum requirements for the siting, design, construction, and plans for operation of *high-performance green buildings* to

a. reduce emissions from buildings and building systems, enhance building occupant health and comfort, conserve water resources, protect local biodiversity and ecosystem services, promote sustainable and regenerative materials cycles, enhance building quality, and enhance resilience to natural, technological, and human-caused hazards; and

b. support the goal of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

3. SCOPE

Similar to 90.1 with emphasis on stretching beyond the bounds of 90.1 in all areas.

ASHRAE SSPC 189.1

WHY IS IT IMPORTANT?

- *189.1 comes from*
  - *high performance building (HPB) community,*
  - *Gov't agencies (DOE, EPA)*
  - *ICC Code Council, MOU to be the technical content to IgCC*
- ***Stretch Standard to 90.1:*** *Can't get what we want >>> Create a new Committee.*
- *Want it to be future National Building Code*
- *Voluntary adoption for state and local jurisdictions*
- *2018 Edition not widely popular or adopted. Created Jurisdictional Options (JO)*
- *Continually looking for ways to eliminate the use of fossil fuels*

ASHRAE SSPC 189.1

Recent Past Amendments: *Addendum "BE" - 2017*

Venting of Combustion Products: *Permanently installed appliances shall have products of combustion vented to the outdoors.*

Exceptions:

d. Heaters certified to ANSI Z21.11.2, provided that the aggregate input rating of all such appliances does not exceed ***1000 Btu/h per 1500 ft^3*** *of space volume.*

- *Severe restriction equates to a ban [ex: 18 x 18 sq ft space w/8 ft, 2000 Btu/hr limit]*
- *Gas-fired Unvented combustion is the… Low Hanging Fruit.*
- *Good News: Market size for unvented heaters in "Green" high-rise practically zero.*
- *Also bans Commercial/Industrial Recirculating Make-up Air Heaters*

ASHRAE SSPC 189.1

CURRENT CONCERNS!

- Progressively Pushing “Electrification”
- Proposal to require both electric and gas connections in new construction and renovations for ease of fuel switching
- WG7, Energy Efficiency (Ch. 7 - Prescriptive)
- WG7.5, Energy Efficiency (Ch. 7 - Performance)
- WG8, Indoor Environmental Quality (Ch. 8 – Previously banned unvented heaters)

ASHRAE SSPC 62.2

1. TITLE

Ventilation and Acceptable Indoor Air Quality in Residential Buildings

2. PURPOSE

This standard defines the roles of and minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality (IAQ) in residential buildings.

3. SCOPE

This standard considers chemical, physical, and biological contaminants that can affect air quality. Thermal comfort requirements* are not included in this standard.

* See ANSI/ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.

ASHRAE Standing Standards Project Committee (SSPC) 62.2

- Ventilation and **Acceptable Indoor Air Quality** in **Residential Buildings**

- "**acceptable indoor air quality:** air toward which a substantial majority of occupants express no dissatisfaction with respect to odor and sensory irritation and in which there are not likely to be contaminants at concentrations that are known to pose a health risk."

- **Residential buildings:**
  - *All Low and High Rise*
  - *Single and Multi-family*

ASHRAE 62.2

Ventilation and Acceptable Indoor Air Quality in Residential Buildings

- Committee Make-Up Balanced?
  - *General (National Labs, Academia, Researchers)* ***(12)***
  - *Owner/Operator/Occupant (3) incl. Fmr LBNL mole*
  - *Designer/Builder (3) incl. NAHB*
  - *Industry (Trade Assoc.) (4) incl. NPGA, AGA, AHRI, Consult.*
  - *Manufacturer/Filter (0)*
  - *Manufacturer/Other (6)*
  - *Compliance (2)*

Recent Past Addendum “a”

- **Addendum a:** *Blocked Twice on Procedural Appeal, Unpublished!*
- Restricted Heater Size to *1085 Btu/hr per 1500 cu ft* of space (recall 189.1)
- For 188 Sq Ft space with 8-Ft Ceiling - Approx. 13’ x 14’ space
- 62.2, Used Different Model vs 189.1
- **Max NO2 Concentrations Cannot Exceed 110 ppb**
- Heater Size of Pilot Burner

Pilot light is 800 – 1000 Btu/hr

Addendum “a” Comparison

- Smallest Heater Size 6,000 Btu/hr (small / med gas range burner)
- Need 8500 Cu Ft Space, or *1060 Sq Ft with 8 ft Ceiling*
- (small single-family home)

Imagine trying to heat this space with a 6k Btu/hr Range top Burner.

Industry compromise position:

- 62.2 Mainly Concerned With:
  - *Reducing NO2 concentrations from emissions from Unvented Heaters*

- How 62.2 Addressed
  - *Heater Size Restriction*
  - *Assumed Continuous Operation (Steady State) Mass Balance Model*
  - *Assumed tight construction… 0.31 to 0.35 ACH*

- Mass Balance Model Using Assumptions:
  - *No consideration of thermal effects and comfort in space*
  - *SS Operation 4-9 hrs/ Vast majority of heaters cycle on/off are multi-stage or modulating*

- Concentrations Drastically Different if Use Cycling Operation in the Model

Industry compromise position:

- Addendum “c” *(After BOD Rejected Addendum “a” 2019)*
  - *Collaborative work under ASHRAE StdC ad hoc group completed spring 2020*
- Proposed Summer 2020
  - *Overwhelmingly adopted by 62.2 (June)*
  - *Overturned two-months later (August)*
- Introduction of Secret White Paper (WP) Aug 2020:
  - *Three 62.2 members authored the WP*
  - *Would not share with industry outside of Committee*
  - *Claimed confidential - not to be shared beyond Committee (Why?)*
  - *To be peer-reviewed and published in ASHRAE Journal*

Industry compromise position:

- 62.2 Decides to Discontinue Addendum “c"
  - *August 2020*
- In Favor of Resurrecting Addendum “a”
  - *Claimed… Not a standards action (Procedural error)*
  - *Nov 2020 Approved by BOD for publication*
  - *Lead to Second Successful Procedural Appeal*
- Introduction of Addendum “j”:
  - *Prohibit installation of unvented heaters*
  - *Again, based on unpublished WP*
  - *Just published in May 2022 ASHRAE Journal, almost 2-years later*
- Goal Posts Moved Again (WHO 110 ppb, now 70 ppb according to WP)
- Addendum “a” is published, no WP and fine with 110 ppb *(Clear Intent to Ban!)*
- Collision Course for Third Appeal

SPC 228P

Standard Method for Evaluating Zero Net Energy and Zero Net Carbon Building Performance

- Proposed
- ASHRAE Standard 228-202x sets requirements for evaluating whether a building or group of buildings meets a definition of “zero net energy” or whether those buildings meet a definition of “zero net carbon.” It provides a consistent method of expressing qualifications for zero net energy and zero net carbon buildings associated with the design of new buildings and the operation of existing buildings.
- First 45-day public review April 2021, second January 2022
- Considering public comments
- Struggling to address carbon offsets that could be traded
- A beneficial tool for Hydrocarbon Industry
- Another public review is likely to advance these concepts

OTHER Committees of Interest

- SSPC 100, *Standard for Energy Efficiency in Existing Buildings*
- SPC 105, *Standard Methods of Determining, Expressing and Comparing Building Energy Performance and Greenhouse Gas Emissions*

Gas Stoves (i.e., Ranges / Ovens)

Three Recently Published Studies on Gas Usage in Kitchens

- *Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes* (Environmental Science & Technology, 2022)
- *The Emissions in the Kitchen: How the CPSC Can Address the Risks of Indoor Air Pollution from Gas Gas Stoves* (Institute for Policy Integrity, NY University School of Law, April 2022)
- *Studying the Optimal Ventilation for Environmental IAQ – i.e., STOVE* (National Center for Healthy Housing, April 2022) 62.2 Committee Mbr.
- ***True Comparison study on Kitchens would have considered both gas and electric and cooking effluents***

Coincidence for the timing of these new studies?

Summary

- Attacked from Multiple Fronts
- ASHRAE (the Org) is not to blame (*Hands are tied*)
- Climate Change Agenda (Low hanging fruit)
- Membership Ideologues
- Coordinated effort? (Not just ASHRAE: Gov, Private and Public Sectors)
- Divide and Conquer
  - *Force industry to split time, staff and significant financial resources to combat*

QUESTIONS?

THANK YOU