MINUTES

BOARD OF DIRECTORS MEETING

VIRTUAL ANNUAL MEETING
Wednesday, July 1, 2020

Approved by the Board of Directors August 10, 2020.

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Board of Directors Meeting

Wednesday, July 1, 2020

PRINCIPAL APPROVED MOTIONS

Board of Directors Meeting

Wednesday, July 1, 2020

No. - Pg.	Motion
1 - 4	That the following motions be approved via a consent agenda: o That Oakbridge Partners, Ltd. be approved as ASHRAE investment advisor for fiscal year 2020-2021. o That Jones & Kolb be approved as ASHRAE Certified Public Accountant for fiscal year 2020-2021. o That the appropriate and required bank resolutions for institutions in which ASHRAE funds are deposited as executed by officers for fiscal year 2020-2021 be approved.
2 - 4	That the Board of Directors select McGuireWoods as the Society's law firm of record for SY 2020-21.
3 - 5	That the Board of Directors approve the Memorandum of Understanding (MOU) with New York State Energy and Development Authority (NYSERDA) as shown in ATTACHMENT B.
4 - 6	That the ASHRAE Bylaws Article II be amended to change the print grade "Member" to "Full Member."
5 - 6	That ROB 2.301.001 be changed to allow up to six (6) Society Directors to serve on Members Council as indicated below, beginning Society Year 2020-21. **2.301 MEMBERS COUNCIL** **2.301.001 MEMBERSHIP** The members of this council are as follows: A. Chair: President Elect B. Vice Chair, Treasurer C. Voting Members: Chair, Vice Chair; up to ~~five (5)~~ six (6) Directors, and the Region Members Council Representatives (RMCR) from each region.
6 - 6	That ROB 3.300.005, Appointments, B.1 be revised as shown below: Regional Vice Chairs shall hold ~~Member~~ a membership grade ~~or higher~~ in the Society as indicated in the grassroots qualifications section~~, shall have been in the grade of Member~~ and shall be in good standing ~~for three years prior to the start of their terms and shall reside in the Region~~. Regional Vice Chairs shall reside in the Region they represent.
7 - 6	That a waiver for Society Year 2020-2021 to allow Madison Schultz to serve in a dual role as Regional Vice Chair of Region VIII and Jr. Vice Chair (second vice chair) on the YEA Committee be approved.
8 - 7	The ASHRAE Bylaws be amended to change references from "Member" grade to "Full Member" grade, as indicated below: **ASHRAE Bylaws** **Section 2.1 Grades of Membership**. These shall be designated as follows: (A) Honorary Member, (B) Presidential Members, (C) Fellow, (D) Life Member, (E) Life Associate Member, (F) **Full** Member, (G) Associate Member, (H) Affiliate Member, and (I) Student Member. …

	Section 2.4 Fellow. A **Full** Member who has attained distinction in the arts relating to the sciences of heating, refrigerating, air conditioning, or ventilating, or the allied arts and sciences, or in the teaching of major courses in said arts and sciences, or who by reason of invention, research, teaching, design, original work, or as an engineering executive on projects of unusual or important scope, has made substantial contribution to said arts and sciences, and has been in good standing as a ~~full grade~~ **Full** Member for at least ten (10) years is eligible for election to the grade of Fellow by the Board of Directors. **Section 2.5 Life Member**. A Member who has been a ~~full~~ Full Member in good standing for an accumulative total of thirty (30) years and who has attained the age of sixty-five (65) years. The member shall retain all the rights and privileges of the most recent membership grade. **Section 2.7 Full Member**. A Full Member shall have the equivalent of twelve Society-approved years of experience composed of an approved combination of (a) completed education beyond high school, (b) work experience, and (c) professional engineering or related professional registration or license issued by a legally authorized body. … **Section 2.11 Voting Membership**. Voting members shall consist of Honorary Members, Presidential Members, Fellows, Life Members, Full Members, Life Associate Members, and Associate Members. Student Members shall have the right to vote and hold office at the Student Branch level only. **…** **Section 2.19 Dues Payment.** If any Fellow, Full Member, Associate Member, or Affiliate Member shall fail to pay the current dues by three months after the due date, the member shall be classed as delinquent and, if a Voting Member, shall lose the member's right to vote. If such dues are not paid by six months after the due date, membership in the Society shall cease." … **Section 4.2 Election**. … …Only Fellows, Life Members, and Full Members shall be eligible for election as voting member of the Board of Directors. **Section 7.2 Committee Members**. … ...The Chair and Vice Chair of each committee shall hold the grade of Full Member or higher in the Society, except as otherwise provided in these Bylaws. … **Section 7.6 Nominating Committee**. This standing committee of the Society shall select candidates for elected officers and members of the Board of Directors. It shall consist of at least twenty-two members, each of whom shall hold the grade of Full Member or higher in the Society. Each shall have been a ~~full~~ Full Member in good standing in the Society for a period of at least five years at the time of selection. Committee membership shall be comprised of the chair, the vice chair, one member and one alternate from each region of the Society selected by the Chapters Regional Committee of each region, and at least eight members and eight alternates selected by the Board of Directors.
9 - 8	That the BOD approve the ASHRAE Units Policy (ROB 1.201.002):

	1.201.002 Units Policy (82-07-01-30/84-06-21-39/85-06-27-41/87-01-19-28/88-05-21-37/90-02-14-10/90-06-14-31/91-01-24-51B/92-07-02-39/93-07-01-54/94-01-26-57/94-06-30-32B/95-02-02-38/95-06-29-29/01-06-28-38C/04-06-30-13/07-06-27-22/08-06-25-14/09-06-24-14/11-06-29-07/12-06-27-20) 1.201.002.1 The units use or application policy shall include, as a minimum, time-dated directions on the use of SI and I-P in all ASHRAE publications. 1.201.002.2 TC 1.6 shall serve as the authority on SI and I-P usage and application. 1.201.002.3 Research projects; codes, standards, guidelines and addenda hereto; special publications; Insights articles; Journal articles; and Handbooks shall be prepared using the International System of Units (SI) and/or inch-pound units (I-P) in formats approved by the Publishing and Education Council. 1.201.002.4 The Publishing and Education Council shall review annually the approved formats to be used in ASHRAE publications, considering suggestions from members and committees, and shall establish any changes in the approved formats. 1.201.002.5 The Publishing and Education Council shall consider this Units Policy annually and shall recommend to the Board of Directors the formats to be used in ASHRAE publications. A. The format for ASHRAE publications shall be dual units, except in cases determined by the Publishing and Education Council, where two separate versions are to be published, where one is rational SI and the other is rational I-P. For selected ASHRAE standards and guidelines, the Standards Committee may approve use of SI units only. B. In dual unit publications, the units used in calculating the work Being reported shall be listed first. The alternate system of units should follow in parentheses. Authors shall round off equivalents in the alternate system of units so that they imply the same accuracy as is implied with primary units. C. Exceptions require the approval of the Director of Publishing and Education. 1.201.002.6 Handbook volumes shall be published in separate SI and I-P editions. 1.201.002.7 *Science and Technology for the Built Environment*, as ASHRAE's International research journal may publish papers in dual units or, in cases where the original research being reported was conducted in SI units, in SI units only.
10 - 10	That the following motions be approved as a consent agenda

	1. Standards Committee recommends that BSR/ASHRAE Addendum b (*filter removal efficiency*) to ANSI/ASHRAE Standards 52.2-2017, *Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size*, be approved for publication. 2. Standards Committee recommends that BSR/ASHRAE Addendum c (*thermal environmental control classification*) to ANSI/ASHRAE Standard 55-2017, *Thermal Environmental Conditions for Human Occupancy*, be approved for publication. 6. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *m (Hot Water Distribution)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication. 7. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *t (compliance requirements)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication. 8. Standards Committee recommends that BSR/ASHRAEI/ICC/USGBC/IES Addendum *z (Source Energy Conversion Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication. 9. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *aa (CO_2e Emissions Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication 10. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *ah (Dwelling Unit Lighting Efficacy)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.
11 - 11	That Technology Council motions 3 - 5 be approved as a consent agenda. 3. Standards Committee recommends that BSR/ASHRAE/IES Addendum *by (Renewables Requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication. 4. Standards Committee recommends that BSR/ASHRAE/IES Addendum *ck (adds renewable requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication. 5. Standards Committee recommends that BSR/ASHRAE/IES Addendum *cp (Appendix G Renewables)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.
12 - 11	That Standards Committee recommends that BSR/ASHRAE Standard 221P, *Test Method to Field-Measure and Score the Cooling and Heating Performance of an Installed Unitary HVAC System*, be approved for publication.
13 - 12	That Technology Council motions 12 and 13 be approved as a consent agenda.

	12. Standards Committee recommends that the following Title, Purpose and Scope (TPS) be approved and that a new Standard Project Committee be formed: **TITLE:** CDL - A Control Description Language for Building Environmental Control Sequences **PURPOSE:** The purpose of this standard is to define a declarative graphical programming language for building environmental control sequences that is both human and machine readable, designed for specification, implementation through machine-to-machine translation, documentation, and simulation. **SCOPE:** This standard applies to building automation systems controlling environmental systems such as mechanical systems, active facades, and lighting. 13. Technology Council recommends that ASHRAE officially recognize and promote annually June 26th as World Refrigeration Day to serve as a means of raising awareness and understanding of the important contribution that refrigeration, air conditioning, and heat pumps make globally across many aspects of modern life and society.
14 - 12	That Tech Council motions 14 and 15 be approved as a consent agenda. 14. Technology Council recommends that the Board of Directors approve and publish the revised *Environmental Tobacco Smoke Position Document* as shown in Attachment E. 15. Technology Council recommends that the Board of Directors approve and publish the revised *Indoor Air Quality Position Document* as shown in Attachment F.
15 - 13	That Tech Council motions 16 and 17 be approved as a consent agenda. 16. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 2.406.01.1 be revised as shown: **2.406.01 MEMBERSHIP** 2.406.01.1 Composition The members of this committee are as follows: A. Maximum of fifteen (15) voting members, including a chair and vice chair.~~;~~ B. Voting members shall include at least: 1. a past member of the Standards Committee. 2. One past member of the Research Administration Committee Research Liaison for 2.0,4.0, or 5.0) 3. one past chair of a technical committee involved in environmental health or indoor air quality issues. 4 one member from outside the U.S. and Canada 5. two Health Professional (such as an industrial hygienist, physician, an epidemiologist, or a public health official.)

6. a past Society officer who has recently served in that capacity. (85-06-27-58/86-06-22-22/98-01- 16-16/07-03-02-6B/18-06-27-20)

C. Non-voting members include a Board ex-officio member~~,~~ and a coordinating officer, ~~and immediate past chair~~. (15-07-02-18)

17. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 1.300, *Position Documents and Public Policy Issue Briefs*, be revised as shown:

Definitions
An ASHRAE Position Document is a BOD-approved document expressing the views of the Society on a current issue of importance to ASHRAE and its members. It includes a concise summary statement as well as supporting documentation, analysis and/or rationale, and recommendations. Position Documents are automatically withdrawn if not reaffirmed or revised within 36 months of issue. Each version of a Position Document will contain the expiration date on the cover.

An ASHRAE Public Policy Issue Brief (PPIB) is a one-page brief on current relevant legislative/regulatory issues that are of interest to ASHRAE. An Issue Brief is developed by the Government Affairs Committee and approved by the Executive Committee (ExCom). Each version of an Issue Brief will contain the statement, "This version expires one year after the date of approval." (07-01-31-23B)

Initiation: Any ASHRAE officer, member, committee or council, or any responsible outside entity may suggest issues for which an ASHRAE Position Document or Public Policy Issue Brief should be developed or may suggest whether existing ASHRAE documents should be revised, withdrawn, or rescinded.

a) Position Documents ~~R~~requests should be sent to the Technology Council chair for consideration. Position Documents ~~and Public Policy Issue Briefs~~ are produced using the procedures and forms located in the Technology Council MOP. Position Documents are evaluated by Technology Council at intervals not to exceed 30 months.

b) Public Policy Issue Brief requests are sent to Government Affairs Committee for consideration. Government Affairs Committee shall make recommendations to create a new PPIB; re-affirm, amend, or expire and remove existing PPIBs. PPIB's are developed using the procedures located in the Government Affairs Committee MOP. PPIBs are evaluated by Government Affairs Committee at intervals not to exceed 12 months.

1.300.003 Approval (14-07-02-29)

1.300.03.1 Technology Council recommends publication of Position Documents including
changes, to the Board of Directors for approval.

1.300.03.2 Technology Council approves re-affirmation or withdrawal of Position Documents
and reports to the Board of Directors for information.

	1.300.03.3 The Board of Directors acts on Technology Council recommendations for publication of Position Documents) (14-07-02-29) 1.300.03.4 After review and approval by ~~With the recommendation of (or after satisfactory review by)~~ Technology Council, ~~PPIBs~~ Public Policy Issue Briefs shall be ~~approved by~~ sent to ExCom for approval. Upon ~~with information~~ approval, information copies shall be forwarded to the Board of Directors, Members Council and Technology Council. 1.300.04 **Archiving, Publication and Distribution** (12-06-27-19/12-10-26-11) 1.300.004.1 Position Documents A. The Technology Department shall maintain information concerning the history of development and approval of Position Documents. B. The Publications and Education Department shall be responsible for final editing, publication and distribution of Position Documents. C. Current Position Documents will be posted on the ASHRAE website for free download. D. Technology Council shall maintain the current list of Position Documents on the ASHRAE website. 1.300.004.2 Public Policy Issue Briefs (17-06-28-11) A. Government Affairs Committee shall manage the current list of Public Policy Issue Briefs by evaluating each at least on an annual basis and formally decide to re-affirm, amend, or let expire and remove, each brief, subject to the approval of the Executive Committee. B. The ~~Publications and Education Department~~ Government Affairs Committee shall be responsible for archiving, publication and distribution of Public Policy Issue Briefs. (end of 1.300 and end of Volume 1)
18 - 16	That Volume 1 Principles and Policies in the ROB be revised as follows: **VOLUME 1** **PRINCIPLES AND POLICIES** **Table of Contents** **1.100 GOVERNING DOCUMENTS AND PRINCIPLES**

	1.100.001 Government 1.100.002 Definitions **1.110 MISSION, CORE VALUES, VISION, and POSITIONING** 1.110.001 Mission Statement 1.110.002 Core Values 1.110.003 Vision Statement 1.110.004 Positioning Theme **1.120 BYLAWS** **1.130 STRATEGIC PLAN** **1.140 CODE OF ETHICS** 1.140 001 Code of Ethics 1.140.002 Conflict of Interest Policy **1.150 DIVERSITY AND INCLUSION** 1.150.001 Diversity Statement
19 - 17	That the SRC MOP, as shown in ATTACHMENT H be approved.
20 - 17	That the recognition of all $1,000+ donors to the Presidents' Scholarship be on a plaque on the President's Wall.
21 - 17	That the unused funds allocated for the building campaign budget roll to next year's building campaign budget (SY 2020-21).
22 - 17	That the names rooms and spaces (as noted in ATTACHMENT I) for the new HQ building be approved.
23 - 18	That the Planning Committee MOP as shown in ATTACHMENT J be approved.

ACTION ITEMS

Board of Directors Meeting

Wednesday, July 1, 2020

No. - Pg.	Responsibility	Summary of Action	Status
1 - 6	Mehboob	Work with Members Council and YEA to review the following - the age requirement to serve on the YEA Committee and determine if it is necessary; and the workload and necessity of two Vice Chairs.	

MINUTES
BOARD OF DIRECTORS MEETING
Wednesday, July 1, 2020

MEMBERS PRESENT:
Chuck Gulledge, President
Mick Schwedler, President-Elect
Farooq Mehboob, Treasurer
Don Brandt, Vice President
Bill Dean, Vice President
Tim McGinn, Vice President
Bill McQuade, Vice President
Jeff Littleton, Secretary
Chris Phelan, Region I DRC
Jeff Clarke, Region II DRC
Dunstan Macauley, Region III DRC
Steve Marek, Region IV DRC
Chris Gray, Region VII DRC
Randy Schrecengost, Region VIII DRC
Doug Zentz, Region V DRC
Rick Hermans, Region VI DRC
Tyler Glesne, Region IX DRC
Devin Abellon, Region X DRC
Robin Bryant, Region XII DRC
Apichit Lumlertpongpana, Region XIII DRC
Andres Sepulveda, Region XIV DRC
Wade Conlan, DAL
Ken Fulk, DAL
Katherine Hammack, DAL
Jaap Hogeling, DAL
Sarah Maston, DAL
Chandra Sekhar, DAL
Adrienne Thomle, DAL
Ashish Rakheja, DAL

GUESTS PRESENT:
Darryl Boyce
Dennis Knight
Ron Jarnagin
Bill Bahnfleth
Tom Phoenix
David Underwood
Tim Wentz
Bjarne Olesen
Sheila Hayter
Larry Schoen
John Constantinide
Richie Mittal
Kevin Marple
Wayne Stoppelmoor
Van Baxter
Charles Dorgan
Don Denton
Eman Abu Taleb
Karine Leblanc
Nitin Naik
Trent Hunt
Iaian Walker
Pat Graef
Doug Cochrane
David Delaquila
Fabio Clavijo
Ross Montgomery
Bruno Martinez
Brendan Hall
Todd Lumpkin
Shannon Corcoran
Eileen Jensen
Craig Wray
Paul Francisco
Joe Berman
Abbas Sajid
Akbar Zaheer
Anish Simha
Ginger Scoggins
Jenson Sebastian
Jonathan Smith
Max Sherman
Rob Falke
Udaa Perera

STAFF PRESENT:
Candace DeVaughn, Manager - Board Services
Chandrias Jacobs, Coordinator - Board Services
Joyce Abrams, Director - Member Services
Vanita Gupta, Director - Marketing
Kim Mitchell, Chief Development Officer
Mark Owen, Director - Publications & Education
Stephanie Reiniche, Director - Technology
Craig Wright, Director - Finance & Admin. Services
Alice Yates, Director - Government Affairs
Lilas Pratt, Manager - Special Projects
Tanisha Meyers-Lisle, Procedures Administrator
Karen Murray, Manager - Professional Dev.
Tony Giometti, Sr. Manager - Conference Programs
Vickie Grant, Manager - Region Activities
Emily Porcari, Manager - State & Local Govt. Affairs
Dustin Mason, Development Manager
Heather Kennedy, Editor - ASHRAE Handbook
Connor Barbaree, Sr. Manager - Standards
Daniel Gurley, Manager - Membership & Member Contact Center
Sarah Foster, Editor
Margaret Smith, Development Manager - Foundation

CALL TO ORDER

Mr. Gulledge called the meeting to order at 8:00 am.

CODE OF ETHICS

Mr. Gulledge read the code of ethics commitment and encouraged everyone to read the full Code of Ethics and Core Values online.

REPORT OF SPRING 2020 MEMBER BALLOT

Mr. Littleton reported that there were two items on the ballot - the election of officers and directors and a proposed Bylaws change. Participation in the ballot was higher than last year. This year, there were 3,627 responses, which represents 7.96% of the membership eligible to vote.

All of our new officers and directors have been affirmed by overwhelming majority. All officers and directors received at least 99% of those responding to the ballot. Congratulations to all the new officers and directors and thank you for the time you invest to lead the BOD.

The proposed Bylaws change would increase the number of signatures required for a petition-based nomination. A Bylaws change requires that 2/3 of those members voting approve the change. 3,236 voted for the change, 266 voted against, and 125 did not answer the Bylaws question. Those voting for

the change account for 92.4% of those responding to the ballot, so the 2/3 requirement has been met and those Bylaws are deemed to be approved will be updated accordingly.

The spring 2020 member ballot results are now considered official.

CLOSING THE MEETING OF THE MEMBERS

Mr. Boyce asked if there was any additional business to come before the assembly. Hearing none, he declared the Annual Meeting adjourned.

Mr. Boyce was applauded and thanked. He expressed that it was his honor to serve ASHRAE.

ROLL CALL / INTRODUCTIONS

Roll call was conducted. Members and guests in attendance as noted above.

REVIEW OF MEETING AGENDA

Mr. Gulledge reviewed the meeting agenda. There were no changes or additions.

OPEN SESSION - COMMENTS READ INTO RECORD

Mr. Gulledge reported that like at the in-person Annual Meeting, the Board of Directors meetings are open. In the virtual format, time has been set aside to read into record any comments or questions submitted to the Board of Directors via the online form that was available through 6 pm ET on Friday, June 26.

Mr. Mehboob and Mr. Schwedler read the comments submitted into record. All comments submitted are included in ATTACHMENT A.

REPORTS OF 2020 VIRTUAL ANNUAL MEETING

MEETING REGISTRATION AND ACTIVITY UPDATE

Mr. Littleton reported that as of yesterday evening, there were 2,421 registrations for the virtual conference; 662 individual registrations came underneath 51 corporate registration packages. The 2019 Kansas City Annual Conference had 1,560 attendees.

There were 96 sessions involving 249 different presentations. A total of 449 virtual meetings were scheduled to take place between May 13 and July 21; these meetings represent 137 Society standing committee meetings and 312 technical and project committee meetings.

The virtual conference is expected to generate $191,000 in revenue, $105,000 in expenses, for a surplus of $88,000. The original budget of the in-person Austin Conference would have resulted in a loss of $161,000.

Technical sessions have averaged between 300 and 375 attendees. President Boyce's presentation was the highest attended *Leadership Moment.* The SARS/MERS/Ebola session was the highest attended technical session. The virtual happy hours averaged between 100 and 150 attendees and were very positively received.

Mr. Littleton congratulated the BOD for acting decisively to pivot to a virtual conference. The virtual conference has been a huge win and the BOD was thanked for their leadership.

The virtual bookstore offered discounts to all attendees. No details on the number of attendees taking advantage of that discount were not yet available.

Sessions will be available on demand for 18 months. It is very likely that there will be additional people paying the registration fee in the coming months, in order to have access to the on demand content.

Mr. Gulledge thanked staff for their efforts and applauded the incredible job pivoting to conduct a successful virtual conference.

CONSENT MOTIONS

Ms. Hammack moved and Mr. Zentz seconded that

1. The following motions be approved via a consent agenda:

- That Oakbridge Partners, Ltd. be approved as ASHRAE investment advisor for fiscal year 2020-2021.
- That Jones & Kolb be approved as ASHRAE Certified Public Accountant for fiscal year 2020-2021.
- That the appropriate and required bank resolutions for institutions in which ASHRAE funds are deposited as executed by officers for fiscal year 2020-2021 be approved.

MOTION 1 PASSED (Unanimous Voice Vote, CNV).

APPOINTMENT OF LEGAL COUNSEL

ExCom recommended and Mr. Schwedler moved that

2. The Board of Directors select McGuireWoods as the Society's law firm of record for SY 2020-21.

Mr. Littleton stated that ASHRAE has used King and Spaulding for some time. Unfortunately, the service we have been getting in certain areas has declined and has caused frustration. Have had good experiences in working with McGuireWoods.

McGuireWoods has 1,100 attorneys in 21 locations and they have an office in New York which is advantageous to the Society. McGuireWoods assisted with the sale of the current ASHRAE Headquarters to Children's Healthcare of Atlanta, again through the acquisition of 180 Tech Parkway, and most recently to address the hotel and vendor contract cancellations related to the in-person Austin Conference.

McGuireWoods has attorneys that work specifically with non-profits and tax-exempt organizations.

McGuireWoods has relationships with law firms in other countries and would be able to refer Society to a firm if necessary.

King and Spaulding will continue to represent the Society in the PR.org lawsuit.

Staff did investigate other law firms but there was not the same experience exposure to those other firms. Mr. Littleton is confident in the recommendation.

MOTION 2 PASSED (Unanimous Voice Vote, CNV).

CONFIRMATION OF 2020-2021 APPOINTMENTS

Mr. Gulledge reported that full list of 2020-2021 Committee and Council appointments have been selected through the BOD election or the appointments process.

No changes or additional comments.

ASSIGNMENT OF 2020-2021 BOD MENTORS

Mr. Gulledge reviewed the mentor assignments. Third year DRCs and DALs were matched with new members.

Mentors were thanked and Mr. Gulledge stated that he looked forward to their stewardship and bringing the new BOD members into the fold.

EXECUTIVE COMMITTEE REPORT

ExCom recommended and Mr. Gulledge moved that

3. The Board of Directors approve the Memorandum of Understanding (MOU) with New York State Energy and Development Authority (NYSERDA) as shown in ATTACHMENT B.

Ms. Yates thanked GAC members and specifically Brendan Hall, for their work with NYSERDA and government affairs in New York.

Mr. Phelan thanked staff and Brendan Hall for their work. This level of engagement is what we have wanted; there are eight Chapter in New York and they have all participated in ASHRAE's Day on the Hill.

MOTION 3 PASSED (Unanimous Voice Vote, CNV).

Mr. Gulledge reported the Executive Committee approved the *Utilizing Energy Metrics and Building Benchmarking to Improve Whole Building Energy Performance* Public Policy Issue Brief (PPIB). This approval brings the total number of newly approved PPIBs to seven (7).

The Executive Committee approved the initiation of revisions to three (3) Position Documents (PDs).

ExCom approved an MOU renewal with REHVA (ATTACHMENT C).

ExCom is currently reviewing proposed training videos related to sexual harassment. If approved, the links for the training videos would be disseminated to Councils, Committees, Regions, and Chapters.

COUNCIL REPORTS

MEMBERS COUNCIL

Mr. Schwedler reported. Members Council recommended and Mr. Schwedler moved that

4. The ASHRAE Bylaws Article II be amended to change the print grade "Member" to "Full Member."

MOTION 4 PASSED (Unanimous Voice Vote, CNV).

Members Council recommended and Mr. Schwedler moved that

5. ROB 2.301.001 be changed to allow up to six (6) Society Directors to serve on Members Council as indicated below, beginning Society Year 2020-21.

2.301 MEMBERS COUNCIL
2.301.001 MEMBERSHIP
The members of this council are as follows:
A. Chair: President Elect
B. Vice Chair, Treasurer
C. Voting Members: Chair, Vice Chair; up to ~~five (5)~~ six (6) Directors, and the Region Members Council Representatives (RMCR) from each region.

MOTION 5 PASSED (Unanimous Voice Vote, CNV).

Members Council recommended and Mr. Schwedler moved that

6. ROB 3.300.005, Appointments, B.1 be revised as shown below:

Regional Vice Chairs shall hold ~~Member~~ a membership grade ~~or higher~~ in the Society as indicated in the grassroots qualifications section~~, shall have been in the grade of Member~~ and shall be in good standing ~~for three years prior to the start of their terms and shall reside in the Region~~. Regional Vice Chairs shall reside in the Region they represent.

MOTION 6 PASSED (Unanimous Voice Vote, CNV).

Members Council recommended and Mr. Schwedler moved that

7. A waiver for Society Year 2020-2021 to allow Madison Schultz to serve in a dual role as Regional Vice Chair of Region VIII and Jr. Vice Chair (second vice chair) on the YEA Committee be approved.

Ms. Bryant asked if the age requirement for the YEA Committee is limiting those who can serve.

Mr. Mehboob will work with Members Council and YEA to review the following - the age requirement to serve on the YEA Committee and determine if it is necessary; the workload and necessity of two Vice Chairs. **AI - 1**

MOTION 7 PASSED (Unanimous Voice Vote, CNV).

Mr. Schwedler moved and Mr. Macauley seconded that

8. The ASHRAE Bylaws be amended to change references from "Member" grade to "Full Member" grade, as indicated below:

ASHRAE Bylaws

Section 2.1 Grades of Membership. These shall be designated as follows: (A) Honorary Member, (B) Presidential Members, (C) Fellow, (D) Life Member, (E) Life Associate Member, (F) **Full** Member, (G) Associate Member, (H) Affiliate Member, and (I) Student Member.

…

Section 2.4 Fellow. A **Full** Member who has attained distinction in the arts relating to the sciences of heating, refrigerating, air conditioning, or ventilating, or the allied arts and sciences, or in the teaching of major courses in said arts and sciences, or who by reason of invention, research, teaching, design, original work, or as an engineering executive on projects of unusual or important scope, has made substantial contribution to said arts and sciences, and has been in good standing as a ~~full grade~~ **Full** Member for at least ten (10) years is eligible for election to the grade of Fellow by the Board of Directors.

Section 2.5 Life Member. A Member who has been a ~~full~~ Full Member in good standing for an accumulative total of thirty (30) years and who has attained the age of sixty-five (65) years. The member shall retain all the rights and privileges of the most recent membership grade.

Section 2.7 Full Member. A Full Member shall have the equivalent of twelve Society-approved years of experience composed of an approved combination of (a) completed education beyond high school, (b) work experience, and (c) professional engineering or related professional registration or license issued by a legally authorized body.

…

Section 2.11 Voting Membership. Voting members shall consist of Honorary Members, Presidential Members, Fellows, Life Members, Full Members, Life Associate Members, and Associate Members.

Student Members shall have the right to vote and hold office at the Student Branch level only.

…

Section 2.19 Dues Payment. If any Fellow, Full Member, Associate Member, or Affiliate Member shall fail to pay the current dues by three months after the due date, the member shall be classed as delinquent and, if a Voting Member, shall lose the member's right to vote. If such dues are not paid by six months after the due date, membership in the Society shall cease."

…

Section 4.2 Election. …

…Only Fellows, Life Members, and Full Members shall be eligible for election as voting member of the Board of Directors.

Section 7.2 Committee Members. …

…The Chair and Vice Chair of each committee shall hold the grade of Full Member or higher in the Society, except as otherwise provided in these Bylaws.

…

Section 7.6 Nominating Committee. This standing committee of the Society shall select candidates for elected officers and members of the Board of Directors. It shall consist of at least twenty-two members, each of whom shall hold the grade of Full Member or higher in the Society. Each shall have been a ~~full~~ Full Member in good standing in the Society for a period of at least five years at the time of selection. Committee membership shall be comprised of the chair, the vice chair, one member and one alternate from each region of the Society selected by the Chapters Regional Committee of each region, and at least eight members and eight alternates selected by the Board of Directors.

MOTION 8 PASSED (Unanimous Voice Vote, CNV).

Mr. Schwedler reported that the Spacecoast Chapter was dissolved and will now be a section.

Twelve (12) new student branches were approved.

RP goals for 2020-21 will be the same as they were for 2019-20.

Mr. Schwedler thanked Mr. Gulledge and the RMCRs for all of their work on the Council. He congratulated those RMCRs that were recently elected as DRCs.

PUBLISHING AND EDUCATION COUNCIL

Mr. Dean reported. Publishing and Education Council recommended, and Mr. Dean moved that

9. The BOD approve the ASHRAE Units Policy (ROB 1.201.002):

1.201.002 Units Policy (82-07-01-30/84-06-21-39/85-06-27-41/87-01-19-28/88-05-21-37/90-02-14-10/90-06-14-31/91-01-24-51B/92-07-02-39/93-07-01-54/94-01-26-57/94-06-30-32B/95-02-02-38/95-06-29-29/01-06-28-38C/04-06-30-13/07-06-27-22/08-06-25-14/09-06-24-14/11-06-29-07/12-06-27-20)

1.201.002.1 The units use or application policy shall include, as a minimum, time-dated directions on the use of SI and I-P in all ASHRAE publications.

1.201.002.2 TC 1.6 shall serve as the authority on SI and I-P usage and application.

1.201.002.3 Research projects; codes, standards, guidelines and addenda hereto; special publications; Insights articles; Journal articles; and Handbooks shall be prepared using the International System of Units (SI) and/or inch-pound units (I-P) in formats approved by the Publishing and Education Council.

1.201.002.4 The Publishing and Education Council shall review annually the approved formats to be used in ASHRAE publications, considering suggestions from members and committees, and shall establish any changes in the approved formats.

1.201.002.5 The Publishing and Education Council shall consider this Units Policy annually and shall recommend to the Board of Directors the formats to be used in ASHRAE publications.

A. The format for ASHRAE publications shall be dual units, except in cases determined by the Publishing and Education Council, where two separate versions are to be published, where one is rational SI and the other is rational I-P. For selected ASHRAE standards and guidelines, the Standards Committee may approve use of SI units only.

B. In dual unit publications, the units used in calculating the work being reported shall be listed first. The alternate system of units should follow in parentheses. Authors shall round off equivalents in the alternate system of units so that they imply the same accuracy as is implied with primary units.

C. Exceptions require the approval of the Director of Publishing and Education. 1.201.002.6 Handbook volumes shall be published in separate SI and I-P editions.

1.201.002.7 *Science and Technology for the Built Environment*, as ASHRAE's international research journal may publish papers in dual units or, in cases where the original research being reported was conducted in SI units, in SI units only.

MOTION 9 PASSED (Unanimous Voice Vote, CNV).

Mr. Dean reported that High Performance Building magazine will be discontinued. HPB content will be folded in the *Journal* while continuing associated revenue-earning offerings such as the HPB newsletter, website, and supplier webinars.

HPB has been in existence over ten years and has only generated profit one year. The net loss for this publication is significant. It has also been challenging to find projects to feature. HPB has also been competing for ad revenue with the *Journal.*

Mr. Dean yielded the floor to Mr. Wentz who presented on behalf of the PEC Ad Hoc on Strategic Business Development. Full presentation in ATTACHMENT D.

Mr. Wentz reported that it is a risk to ASHRAE to have so much revenue tied to the AHR Expo. The Ad Hoc is recommending two action items to the Finance Committee. First, adopt the use of a single analysis form; and second, reconfigure the accounting system. Finance is well down the path on action item two and that is excellent.

Gross margin targets are also recommended, to allow the BOD to see the full picture. This will empower the BOD and volunteer leadership.

The Ad Hoc also recommends three additional fundamental changes - adopting a market driven business model, integrating products, and develop a sales strategy to sell business to business.

Mini business plans are included as appendices to this report, they are very strategic and high level.

Mr. Wentz thanked the Ad Hoc members for their great work.

Mr. Dean stated that Pub and Ed Council, over the next year, will base its MBOs on the findings of this report and will begin the process. The Council will be implementing many of the recommendations internally.

TECHNOLOGY COUNCIL

Mr. McQuade reported. The publication motions presented below are addenda that have unresolved objectors, negative project committee votes with reason, or a threat of legal action. These motions are preceded by formally voted recommendations from the project committees and Standards Committee. The rules do not require a vote from Technology Council. Appeals procedures now allow for consideration of an appeal of a BOD standards action or inaction only if the negative vote or unresolved comment is based solely upon procedural grounds. A reminder to Board members - members are to review these motions for adherence to ASHRAE's Procedures for Standards Action (PASA) and ANSI Essential Requirements and not technical content. If the BOD disapproves a Standards Committee Document for publication, please minute the detailed reason(s) for record.

A summary of unresolved commenters and/or negative project committee votes on these publication drafts is included in the analysis sheets that were distributed prior to the meeting. By default, all Standards Committee Documents will be processed by our ANSI Audited Designator procedures unless otherwise indicated by the Board. In all cases, the fiscal impact for publication drafts is within existing budgets.

Consent motions 1 - 11 have unresolved commenters or negative project committee votes but no negative votes by Standards Committee. The reasons for the negative votes were technical in nature with no alleged process violations subject to appeal. Please refer to the analysis sheets for the full detail on the reasons for negative votes and/or unresolved commenters and a summary of Project Committee responses that were distributed prior to the meeting.

Mr. McQuade stated that it was his intent to present all Tech Council motions 1 - 11 as a consent agenda. Mr. Hermans requested that Tech Council motions 3, 4, and 5 be removed. It was also requested that Tech Council motion 11 be removed.

Technology council recommended and Mr. McQuade moved that

10. The following motions be approved as a consent agenda

1. Standards Committee recommends that BSR/ASHRAE Addendum b (*filter removal efficiency*) to ANSI/ASHRAE Standards 52.2-2017, *Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size*, be approved for publication.

2. Standards Committee recommends that BSR/ASHRAE Addendum c (*thermal environmental control classification*) to ANSI/ASHRAE Standard 55-2017, *Thermal Environmental Conditions for Human Occupancy*, be approved for publication.

6. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *m (Hot Water Distribution)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the*

Design of High-Performance Green Buildings Except Low-Rise Residential Buildings, be approved for publication.

7. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *t (compliance requirements)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

8. Standards Committee recommends that BSR/ASHRAEI/ICC/USGBC/IES Addendum *z (Source Energy Conversion Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

9. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *aa (CO_2e Emissions Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication

10. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *ah (Dwelling Unit Lighting Efficacy)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

MOTION 10 PASSED (Unanimous Voice Vote, CNV).

Mr. McQuade moved that

11. Technology Council motions 3 - 5 be approved as a consent agenda.

3. Standards Committee recommends that BSR/ASHRAE/IES Addendum *by (Renewables Requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

4. Standards Committee recommends that BSR/ASHRAE/IES Addendum *ck (adds renewable requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

5. Standards Committee recommends that BSR/ASHRAE/IES Addendum *cp (Appendix G Renewables)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

MOTION 11 PASSED (Voice Vote, Hermans Abstained, CNV).

Mr. McQuade moved that

12. Standards Committee recommends that BSR/ASHRAE Standard 221P, *Test Method to Field-Measure and Score the Cooling and Heating Performance of an Installed Unitary HVAC System*, be approved for publication.

Mr. McQuade stated that this motion has a negative Standards Committee vote.

MOTION 12 PASSED (Unanimous Voice Vote).

Mr. McQuade stated that it was his intent to present Technology Council motions 12 and 13 as a consent agenda. These motions address the development of a new ASHRAE Standard and the continued promotion and recognition of June 26th as World Refrigeration Day.

There was no objection to the consent agenda.

Mr. McQuade moved that

13. Technology Council motions 12 and 13 be approved as a consent agenda.

12. Standards Committee recommends that the following Title, Purpose and Scope (TPS) be approved and that a new Standard Project Committee be formed:

TITLE: CDL - A Control Description Language for Building Environmental Control Sequences

PURPOSE: The purpose of this standard is to define a declarative graphical programming language for building environmental control sequences that is both human and machine readable, designed for specification, implementation through machine-to-machine translation, documentation, and simulation.
SCOPE: This standard applies to building automation systems controlling environmental systems such as mechanical systems, active facades, and lighting.

13. Technology Council recommends that ASHRAE officially recognize and promote annually June 26th as World Refrigeration Day to serve as a means of raising awareness and understanding of the important contribution that refrigeration, air conditioning, and heat pumps make globally across many aspects of modern life and society.

MOTION 13 PASSED (Unanimous Voice Vote, CNV).

Mr. McQuade stated that it was his intent to present Tech Council motions 14 and 15 as a consent agenda. These motions address approving the revised Environmental Tobacco Smoke Position Document and the Indoor Air Quality Position Document for publication.

There was no objection to the consent agenda.

Mr. McQuade moved that

14. Tech Council motions 14 and 15 be approved as a consent agenda.

14. Technology Council recommends that the Board of Directors approve and publish the revised *Environmental Tobacco Smoke Position Document* as shown in Attachment E.

15. Technology Council recommends that the Board of Directors approve and publish the revised *Indoor Air Quality Position Document* as shown in Attachment F.

MOTION 14 PASSED (Unanimous Voice Vote, CNV).

Mr. McQuade stated that it was his intent to present Tech Council motions 16 and 17 as a consent agenda. These motions address approving revisions to Rules of the Board 2.406.01, *Membership*, and Rules of the Board 1.300, *Position Documents and Public Policy Issue Briefs*.

There was no objection to the consent agenda.

Mr. McQuade moved that

15. Tech Council motions 16 and 17 be approved as a consent agenda.

16. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 2.406.01.1 be revised as shown:

2.406.01 MEMBERSHIP

2.406.01.1 Composition
The members of this committee are as follows:

A. Maximum of fifteen (15) voting members, including a chair and vice chair.~~;~~

B. Voting members shall include at least:

1. a past member of the Standards Committee.
2. One past member of the Research Administration Committee (Research Liaison for 2.0,4.0, or 5.0)
3. one past chair of a technical committee involved in environmental health or indoor air quality issues.
4 one member from outside the U.S. and Canada
5. two Health Professional (such as an industrial hygienist, physician, an epidemiologist, or a public health official.)
6. a past Society officer who has recently served in that capacity.
(85-06-27-58/86-06-22-22/98-01- 16-16/07-03-02-6B/18-06-27-20)

C. Non-voting members include a Board ex-officio member~~,~~ and a coordinating officer, ~~and immediate past chair~~. (15-07-02-18)

17. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 1.300, *Position Documents and Public Policy Issue Briefs*, be revised as shown:

Definitions

An ASHRAE Position Document is a BOD-approved document expressing the views of the Society on a current issue of importance to ASHRAE and its members. It includes a concise summary statement as well as supporting documentation, analysis and/or rationale, and recommendations. Position Documents are automatically withdrawn if not reaffirmed or revised within 36 months of issue. Each version of a Position Document will contain the expiration date on the cover.

An ASHRAE Public Policy Issue Brief (PPIB) is a one-page brief on current relevant

legislative/regulatory issues that are of interest to ASHRAE. An Issue Brief is developed by the Government Affairs Committee and approved by the Executive Committee (ExCom). Each version of an Issue Brief will contain the statement, "This version expires one year after the date of approval." (07-01-31-23B)

Initiation: Any ASHRAE officer, member, committee or council, or any responsible outside entity may suggest issues for which an ASHRAE Position Document or Public Policy Issue Brief should be developed or may suggest whether existing ASHRAE documents should be revised, withdrawn, or rescinded.

a) Position Documents ~~R~~requests should be sent to the Technology Council chair for consideration. Position Documents ~~and Public Policy Issue Briefs~~ are produced using the procedures and forms located in the Technology Council MOP. Position Documents are evaluated by Technology Council at intervals not to exceed 30 months.

b) Public Policy Issue Brief requests are sent to Government Affairs Committee for consideration. Government Affairs Committee shall make recommendations to create a new PPIB; re-affirm, amend, or expire and remove existing PPIBs. PPIB's are developed using the procedures located in the Government Affairs Committee MOP. PPIBs are evaluated by Government Affairs Committee at intervals not to exceed 12 months.

1.300.003 Approval (14-07-02-29)

1.300.03.1 Technology Council recommends publication of Position Documents including changes, to the Board of Directors for approval.

1.300.03.2 Technology Council approves re-affirmation or withdrawal of Position Documents and reports to the Board of Directors for information.

1.300.03.3 The Board of Directors acts on Technology Council recommendations for publication of Position Documents) (14-07-02-29)

1.300.03.4 After review and approval by ~~With the recommendation of (or after satisfactory review by)~~ Technology Council, ~~PPIBs~~ Public Policy Issue Briefs shall be ~~approved by~~ sent to ExCom for approval. Upon ~~with information~~ approval, information copies shall be forwarded to the Board of Directors, Members Council and Technology Council.

1.300.04 **Archiving, Publication and Distribution** (12-06-27-19/12-10-26-11) 1.300.004.1 Position Documents

A. The Technology Department shall maintain information concerning the history of development and approval of Position Documents.

B. The Publications and Education Department shall be responsible for final editing, publication and distribution of Position Documents.

C. Current Position Documents will be posted on the ASHRAE website for free download.

D. Technology Council shall maintain the current list of Position Documents on the ASHRAE website.

1.300.004.2 Public Policy Issue Briefs (17-06-28-11)

A. Government Affairs Committee shall manage the current list of Public Policy Issue Briefs by evaluating each at least on an annual basis and formally decide to re-affirm, amend, or let expire and remove, each brief, subject to the approval of the Executive Committee.

B. The ~~Publications and Education Department~~ Government Affairs Committee shall be responsible for archiving, publication and distribution of Public Policy Issue Briefs.

(end of 1.300 and end of Volume 1)

MOTION 15 PASSED (Unanimous Voice Vote, CNV).

Mr. McQuade yielded the floor to Mr. McGinn. Technology Council recommended and Mr. McGinn moved that

16. That BSR/ASHRAE addendum *a* (*unvented combustion appliances)* to ANSI/ASHRAE Standard 62.2-2019, *Ventilation and Acceptable Indoor Air Quality,* be approved for publication.

Mr. McQuade recused himself. His employer has a stated opinion on the motion.

There was discussion of the motion being out of order.

Ms. Reiniche stated that the motion is out of order for several reasons - PASA requires that all Standards action be preceded by Project Committee and Standards Committee; the ROB states that it is the Standards Committee responsibility to submit the standards and guidelines to the BOD.

Mr. Hermans stated that this is not a motion to reconsider. It is a request by Tech Council to publish this document with the approval of Standards Committee, which is out of order.

Mr. Gulledge stated that this motion is out of order and will not be presented to the BOD.

MOTION 16 OUT OF ORDER (Not Considered).

Mr. McQuade reported that information items are available for review in the Council's report. The full report is included in ATTACHMENT G.

STANDING COMMITTEE REPORTS

SOCIETY RULES COMMITTEE

Mr. Dean reported. The Society Rules Committee recommended and Mr. Dean moved that

17. ROB Section 4.100.004 Standards be removed as shown below:

~~**4.100.004 Standards**~~
~~A. ASHRAE shall utilize the strategy in the document "Suggested EUI [Energy Use Index] 'Targets' for Code-Intended Standards." (Document located in BOD minutes 2007-03-25, Attachment R) (07-03-25-25)~~
~~B. The ASHRAE Board of Directors commits itself to the development of verifiable performance metrics and verification methods for next generation of residential building energy standards. (09-06-21-08)~~
~~C. ASHRAE shall utilize the strategies and recommendations contained in Section 1 of the "Report of the Technology Council Ad Hoc Committee on Energy Targets" dated 18 June 2010 and received by the BOD on June 22, 2010 (BOD Minutes, June 27, 2010, Attachment A). (10-06-27-03)~~
~~D. The Board of Directors directs Technology Council to develop a plan to implement the recommendations set forth in the Energy Targets Ad Hoc Committee Report, including an organizational structure with refined fiscal estimates. (10-06-27-04)~~

Mr. Hermans expressed disappointment that not much was done with this in the past ten years.

MOTION 17 PASSED (Voice Vote, Mr. Hermans Abstained, CNV).

Society Rules Committee recommended and Mr. Dean moved that

18. Volume 1 Principles and Policies in the ROB be revised as follows:

VOLUME 1
PRINCIPLES AND POLICIES
Table of Contents

1.140.002 Conflict of Interest Policy

1.150 DIVERSITY AND INCLUSION

1.150.001 Diversity Statement

MOTION 18 PASSED (Unanimous Voice Vote, CNV).

Society Rules Committee recommended and Mr. Dean moved that

19. The SRC MOP, as shown in ATTACHMENT H be approved.

MOTION 19 PASSED (Unanimous Voice Vote, CNV).

Mr. Dean reported that SRC reviewed and approved MOPs for the Planning Committee, SRC, and Nominating Committee.

Council liaisons were assigned with introductions to be made by the SRC fall conference call.

An MBO was assigned in support of ASHRAE Strategic Plan Initiative #3. Each volume of the ROB will be reviewed to look for opportunities to streamline the organization and to eliminate duplication effort.

DEVELOPMENT COMMITTEE

Mr. Mehboob reported. The Development Committee recommended, and Mr. Mehboob moved that

20. The recognition of all $1,000+ donors to the Presidents' Scholarship be on a plaque on the President's Wall.

MOTION 20 PASSED (Unanimous Voice Vote, CNV).

The Development Committee recommended, and Mr. Mehboob moved that

21. The unused funds allocated for the building campaign budget roll to next year's building campaign budget (SY 2020-21).

MOTION 21 PASSED (Unanimous Voice Vote, CNV).

The Development Committee recommended, and Mr. Mehboob moved that

22. The names rooms and spaces (as noted in ATTACHMENT I) for the new HQ building be approved.

MOTION 22 PASSED (Unanimous Voice Vote, CNV)

Mr. Mehboob reported that the Development Committee approved a design for the building campaign donor display to ensure appropriate donor recognition and guarantee a cohesive donor recognition design throughout the new HQ building.

The Capital Campaign has raised close to $10.5 million to date, which includes $6.4 million in cash and pledges and $4 million in equipment and services.

The Development Committee made plans to cultivate individual major gift prospects for an eventual building campaign solicitation prior to the end of the campaign.

AUDIT COMMITTEE

Mr. Zentz reported on behalf of the Audit Committee. The committee met and discussed a number of topics, including the review of ASHRAE insurance coverages and recommendations from its broker. The Audit Committee accepted the broker's recommendation with minimal comments.

NOMINATING COMMITTEE

Mr. Olesen reported that the Nominating Committee had a very good year and he is pleased the officer and director candidates were approved by the membership.

The Nominating Committee utilized the tool PollEverywhere and interviews of Treasurer candidates at the Winter Meeting. Both have been very successful and are now written into the Committee's procedures. Nominating has also written procedures on how to conduct a virtual caucus.

The Committee had a lengthy discussion on the possibility of allowing more than one officer and director candidate to be placed on the ballot. At this time, Nominating can only recommend more than one candidate if there is a stalemate at the Fall or Winter Meeting. Committee leadership feels that the topic warrants additional review and discussion.

PLANNING COMMITTEE MOP APPROVAL

The Planning Committee recommended, and Mr. McQuade moved that

23. The Planning Committee MOP as shown in ATTACHMENT J be approved.

MOTION 23 PASSED (Unanimous Voice Vote, CNV).

PRESIDENTIAL AD HOC COMMITTEE AND TASK GROUP REPORTS

BOD STREAMLINING AND LEAN ASSESSMENT

Ms. Bryant reported on behalf of the Task Group. The Task Group's full report is included in ATTACHMENT K.

Ms. Bryant provided a brief summary of the Task Group's recommendations.

Mr. Gulledge stated that the conclusion of the report will be deferred to a later BOD meeting. Members of the BOD were asked to read the report and be prepared for discussion at an upcoming meeting.

INFORMATION ITEMS

FINAL RESULTS FOR BOARD ELECTED POSITIONS

Mr. Gulledge presented the final results for Board elected positions. No changes or comments.

2020-21 CRC SCHEDULE

Mr. Gulledge reported that BOD members will receive an updated version of the CRC schedule via email. It is a fluid document and updates are being made as needed.

CONFLICT OF INTEREST FORMS

Mr. Gulledge asked all BOD members to sign and return the Conflict of Interest form by July 31, 2020.

EXECUTIVE SESSION

Executive session was called at 11:45 am.

Open session reconvened at 12:07 pm.

ADJOURNMENT

The meeting adjourned at 12:08 pm.

Jeff H. Littleton, Secretary

ATTACHMENTS:

A. Open Session Comments
B. NYSERDA MOU
C. REHVA MOU
D. Report of the PEC Ad Hoc on Strategic Business Development
E. Tobacco Smoke Position Document
F. IAQ Position Document
G. Technology Council Report to the BOD
H. SRC MOP Edits
I. New ASHRAE HQ Named Rooms and Spaces
J. Planning Committee MOP Edits
K. Report of the Society Streamlining and Lean Assessment Task Group

2020 Virtual Conference Open Session

Attendees are encouraged to share their thoughts and opinions on the operations and work of the Society with the ASHRAE Board of Directors.

The following comments were received via the online Share Your Thoughts with the Board form.

- **Thomas Randall Jones - Life Member ASHRAE**
  I wish to comment on the motion from the BEQ committee requesting $14K for the SY 20-21. I speak in favor of the motion. This is a very small sum to sustain a program that ASHRAE has already invested in. Our Society has many program, standards, courses and initiatives to improve energy efficiency in new buildings, however the most effective way to address climate change and sustainability, is to improve the efficiency of the existing building stock. The BEQ program is a very powerful tool for measuring energy use in existing buildings and providing suggestions for improved performance.

- **Stephen Roth, PE - Carmel Software Corporation**
  I would like to voice my support for continuing funding of the ASHRAE Building EQ web portal. My company developed the web portal that launched around 3 years ago, so I have unique insight into usage of the portal, which has substantially increased over the past couple of years. The Building EQ portal is used by around 1,000 building owners, energy modelers, university students, and engineers who have invested a fair amount of time and resources into creating 600+ projects. The portal has provided the entire built environment a high-tech interface into just one of the ways that ASHRAE is helping building owners reduce energy usage. Granted, the portal is not bringing in much money, but that was never really the goal. Instead, the goal was to provide building owners a simple alternative to other building benchmark rating systems. While times are difficult now and budgets are tight, keeping the Building EQ portal active would require a minimum investment until funds free up at a later date for additional features and functionality. Thank you for your consideration.

- **Tim Wentz - University of Nebraska**
  I am writing in support of funding for the Building EQ program. I am hopeful that Board will recognize the great potential of Building EQ and will fully fund the program. At the very least, I encourage the Board to fund the continuation of the server. It is very tempting to cut every dollar possible to address the current financial situation. At the same time, all of us in industry know you can't cut your way to financial security. You grow your way to financial security. Building EQ is a viable path to financial growth, as demonstrated in the PED Ad Hoc report on Strategic Business Development. As chair of the ASHRAE-APPA Coordinating Committee I know firsthand how important Building EQ is to our relationship with APPA and APPA's vision for the great potential in growth for Building EQ. For example, I am co-author in the University of Nebraska's new master plan for sustainability, which requires Building EQ (In Operation) for all buildings on campus and also requires both "In Operation" and "As Designed" for all new buildings. Our campus has 153 buildings on it alone. APPA, which strongly supports the Building EQ program, represents over 1,300 campuses worldwide, again demonstrating the great

potential of the product. Building EQ's recent restructuring and adoption of an online portal will unlock that potential and provide an important tool to make buildings more energy efficient. Building EQ is also an important tool in identifying and eliminating the "energy gap," an industry-wide problem. Addressing and solving the energy gap problem would significantly raise ASHRAE's stature in the industry.

- **Ross Montgomery - QST Inc.**
  Dear Board Members, I am a supporter and regular user of the Building EQ program. I am speaking in favor of the Building EQ program to continue and maintain it. I know that it is used by may of our members relative to their jobs and ASHRAE activities, especially the Portal and is University Course. So much evidence supporting this activity has been disseminated to the BOD from the Building EQ committee and its long history of success as a member "niche" service. Many of our members utilize Building EQ through associated activities like GAC, CTTC, SAC, Certification, and Research Administration to name a few. Like so many other niche ASHRAE programs, such as students, certification, residential, or refrigeration programs to name a few, it has a limit to its use because of the percentage of our members that this can be used by, not to mention the committee's limited marketing budget. Building EQ is an important reflection of energy efficiency in our entire built environment, supports our Strategic Plan, is the global alternative to Energy Star, performs both 'As Designed' and 'In Operation' segments, and gives our members a peer-reviewed digital technology tool to be proud of. I completely understand we are living through unprecedented times, but it is not a reason or excuse to discriminate with such a drastic change. "This too will pass" so I suggest we strategically consider spending or minimizing some of our "matching contributions" rules to a smaller degree and use a microscopic part of our reserves to cure this situation for one year.

- **John Constantinide, P.E. - ASHRAE Building EQ Vice Chair and Space Coast Chapter**
  Mr. President and Members of the Board, I want to thank you for your continued past support of the award-wining Building EQ platform, giving it the opportunity to directly empower building owners and engineers to improve our built environment, and I want to encourage you to continue to support the tool in the future. This tool has been central to the Brevard Public Schools Building EQ Pilot Program, garnering the USGBC Green Schools Award in the Transformative Category and Florida Department of Education Green Schools Bronze Award. Student Branches are using this tool to work with licensed and ASHRAE-certified professionals to gain hands-on experience and provide building owners with actionable energy conservation measures. I strongly encourage you to create a Building EQ account, log in to the Building EQ portal, and see how the Portal is such a unique asset that positions ASHRAE Standards and certifications to be more relied upon. With today's pandemic and building tenants changing how they want to use their building spaces with the rise of teleworking, social distancing, and other health-conscious trends, Building EQ is the right tool at the right time to give building owners and engineers a cloud-based and remote solution on how to make buildings better without bankrupting themselves.

- **Dr. Ken Lindeman, Ph.D. - Professor & Chair of the Program in Sustainability, Florida Institute of Technology**
  What a resource! The importance of the Building EQ program and Portal to engineering students doing energy efficiency research for their undergraduate Sustainability minor at Florida Tech cannot be over emphasized. The introduction of the Portal and the patient mentorship of students by local ASHRAE chapter members has been invaluable. The senior research projects completed using Building EQ have resulted in two different ASHRAE Level 1 Energy Audit reports for major buildings on campus. The tool has trained our students to become better engineers for today's workforce and moves Florida Tech and our partners towards a better understanding of our carbon and energy footprints. This has been a win-win exercise for the university and the students. Whether facilities managers or engineering students, the Building EQ program and its portal are win-win tools. A local city government using university interns who were made aware of the tool now wants to use Building EQ for their municipal facilities. Additional cities with possible student internships are expected to also want to examine this tool, further introducing key decision makers to ASHRAE and this resource.

- **Quinn Duffy - Former Chief Sustainability Officer and Alumnus, Florida Institute of Technology**
  I would highly recommend Building EQ, an ASHRAE platform, for the use in conducting energy audits and the benchmarking of structure's performance. It was very easy to learn, extremely helpful in gathering and calculating data, and greatly enhanced the overall experience of this process.

- **Bruce Lindsay, PE, MBA, MS - Manager, Energy & Resource Conservation, Brevard Public Schools**
  As the Brevard Public Schools Manager, Energy & Resource Conservation, we had reservations about transitioning from the Energy Star Portfolio Manager program to ASHRAE Building EQ. Having graduate engineering students analyze utility data, benchmark our schools, and most importantly, generate ASHRAE level 1 audit reports, proved to my staff and leadership team that Building EQ was a preferred tool.

- **Dr. Hamidreza Najafi, Ph.D. - Assistant Professor of Mechanical Engineering & ASHRAE Student Branch Advisor, Florida Institute of Technology**
  ASHRAE Building EQ is an excellent portal for building energy professionals. Not only does it provide a user-friendly platform for the end-users to catalogue and maintain building energy performance data, but it also can be used as an effective teaching tool for engineering students interested in building energy and energy audit. ASHRAE's continued support of Building EQ is certainly a strong representation of its commitment in promoting sustainability in the building sector.

- **Victor Goldschmidt - Retired**
  To my colleagues and members of the Board of Directors, June 2020: I appreciate the practice the Board has formalized in scheduling an "open mike time" during their Annual and Winter meetings. But now, the nature of such is changing, hopefully just for this one year and I want to see the concept of "public comments" to be maintained. So, my comments and questions to

follow. First of all, my thanks to all of you for your willingness to serve ASHRAE. Secondly, I share my regrets with Darryl that his presidential activities through travel and visits have been severely curtailed. But my third comment is that we should welcome aspects of this world-wide temporary "lock-down" to see what the future could bring. Allow me to expand on that. There is evidence that virtual activities such as committee meetings, worship services, training webinars, will many times bring a larger number of participants that they would otherwise. So my questions are a) Could it be timely to address developing ASHRAE Committees, Councils, etc. which are fully virtual and hence there would be no geographical boundaries for its members? b) Could it also be timely to revisit the boundaries, purpose, and empowerment of the Regions? They seem to have survived and some even grown without presidential visits. I am well aware of the limitations of virtual gatherings, they certainly are more efficient, but not as effective as personal one to one group dynamics. However the options must be considered, and I stand ready to serve.

- **David Delaquila - National Propane Gas Association**
  My comments support the rejection of Addendum A, for the following brief reasons.
  1) This Addendum A to ASHRAE Standard 62.2-2019 that is being presented to the Board is no different than the addendum rejected by the Board one year ago. It will result in the effective banning of a viable heating product that will occur if Addendum A is approved. There are no technical or process changes in this motion for the Board to reconsider.
  2) The unresolved commenters on the original Addendum A that was rejected by the Board last year still remain unresolved.
  3) A compromise addendum that is supported by industry was recently approved by the 62.2 Committee for PPR by an overwhelming majority vote 20-4-1. This compromise proposal is welcomed by the industry and is a very positive step forward to resolving virtually all of the issues between all parties.
  4) Approving Addendum A at this stage will only again result in more appeals and potentially more delays for everyone involved.

Memorandum of Understanding
Between
New York State Energy Research and Development Authority and ASHRAE
NYSERDA Agreement No.

This Memorandum of Understanding ("MOU"), dated as of the DD of MONTH, 2020, is entered into by and between the New York State Energy Research and Development Authority ("NYSERDA"), a public benefit corporation of New York State established under Article 8, Title 9A of the State Public Authorities Law and having its principal place of business located at 17 Columbia Circle, Albany, NY 12203, and the American Society of Heating, Refrigerating and Air-Conditioning Engineers ("ASHRAE"), a consolidated corporation under the laws of New York State, and having its principal place of business 1791 Tullie Circle, N.E. Atlanta, GA 30329, to form a strategic partnership and establish the terms and conditions to collaboratively help New York State achieve its clean energy, climate change, economic development, and public health policy goals. NYSERDA and ASHRAE are referred herein individually as "Party" and collectively as the "Parties".

RECITALS

WHEREAS, the mission and vision of NYSERDA are to: (1) advance innovative energy solutions in ways that improve New York's economy and environment; and (2) Serve as a catalyst to advance energy innovation, technology, and investment thereby transforming New York's economy, and empowering people to choose clean and efficient energy as part of their everyday lives; and

WHEREAS, in alignment with New York State policy goals as outlined in the Climate Leadership and Community Protection Act (CLCPA) and New Efficiency New York (NENY), the mission objectives of NYSERDA include the advancement of innovative energy solutions in ways that establish a national best practice model for climate change mitigation and adaptation, resiliency, and clean energy market transformation; and

WHEREAS, ASHRAE is a global society with more than 56,000 members in over 132 countries, and a membership of about 2,700 engineers in New York State; and

WHEREAS, the mission and vision of ASHRAE are respectively: (1) To serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration and their allied fields; and (2) A healthy and sustainable built environment for all; and

WHEREAS, ASHRAE Standards form an integral part of the New York State Energy Code; and

WHEREAS, ASHRAE standards, guidelines, research, training, tools, technical manuals, and best practice guidance form a body of information essential to the New York State clean energy economy and to the achievement of New York State policy goals.

NOW, THEREFORE,

The Parties agree to form a strategic partnership as outlined by the terms and conditions set forth herein, and to work together collaboratively to help New York State achieve its clean energy, climate change, economic development, and public health policy goals.

I. THE PARTIES

Established in 1975, NYSERDA is a New York State public-benefit corporation, located in Albany, New York, with regional offices in New York City, Buffalo, and West Valley. NYSERDA offers information and analysis, programs, technical expertise, and funding aimed at helping New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels. NYSERDA professionals are charged with protecting the environment and creating clean-energy jobs. NYSERDA collaborates with businesses, industry, the federal government, academia, the environmental community, public interest groups, and energy market participants to reduce energy consumption and greenhouse gas emissions.

Founded in 1894, ASHRAE, a not-for-profit 501(c)(3) corporation, is a professional and technical society that serves humanity by advancing the arts and sciences of heating, ventilation, air-conditioning, refrigeration and their allied fields. ASHRAE's more than 56,000 individual members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today, and collaborates with many organizations throughout the buildings industry.

II. PURPOSE

The purpose of this MOU is for ASHRAE to assist through its technical expertise New York State in meeting the climate change, clean energy, market transformation and other public policy goals set forth in the Climate Leadership and Community Protection Act (CLCPA) and under New Efficiency New York (NENY), and to support an effective response to the COVID-19 crisis and enable the safe reopening and operation of buildings in New York State under NY Forward. NYSERDA and ASHRAE agree to work cooperatively to improve the design and application of efficient and low carbon heating, ventilating, air-conditioning, and refrigeration technologies and their application in New York State. Cooperation under this agreement also referred to as "the Work" will focus on the following key areas:

1. Sharing and/or presenting existing research, resources, current knowledge, and best practices on minimizing airborne pathogen exposure through improved IAQ/Ventilation/UVGI for buildings that require operation and occupancy to enable the safe reopening and operation of buildings in NYS.

2. Development of job/task specific contractor and building safety guidelines to minimize airborne pathogen exposure.

3. Development and/or delivery of improved IAQ/Ventilation/UVGI airborne pathogen exposure mitigation and pathogen elimination research, technical and/or guidance manuals, and associated training for building owners, operators, service providers, and the design community with an emphasis placed on energy efficient design, technology, and operational approaches. Assessment of a need to update existing standards, develop new standards and build a custom protocol for New York State.

4. Development of guidance documents, technical manuals, and other technical tools to support NYS policy goals including carbon neutral buildings, building electrification, carbon emission load calculations, clean geothermal district systems, and other public policy goals. Development of standards or updating existing standards through the ANSI process that cover topics such as net zero buildings, building electrification, carbon-based energy, and clean thermal district.

5. Development and/or delivery of new or existing ASHRAE professional training on the application of codes, standards, guidance documents, manuals, and tools to support New York State policy goals.

6. Improved communication and information sharing between The Parties to facilitate the following: communication of NYSERDA's available COVID Safe Workforce Training, solicitation of program related feedback, accelerated identification of barriers to market transformation, and the surfacing of insights on new opportunities to grow the clean energy economy in New York State.

7. On demand or project based technical advisory and matchmaking services as mutually agreed.

8. Other activities as needed or beneficial, mutually agreed, and where ASHRAE's and NYSERDA's missions and interests align.

III. AMENDMENT AND TERMINATION

1. This MOU may be modified or amended in writing by the Parties, and such amendments shall become part of, and shall be attached to, this MOU. This MOU may also be terminated with or without cause by any Party upon thirty (30) days written notice.

2. This MOU shall terminate automatically at the end of three (3) years unless revised or extended by written agreement of the Parties.

IV. CONFIDENTIALITY

1. For purposes hereof, "Confidential Information" means any information disclosed, either directly or indirectly, in writing, orally or by inspection of documents, which is indicated as being confidential at the time of disclosure, pursuant to paragraph 4 of this Section.

2. Notwithstanding any other provision of this MOU, the Parties agree to keep all Confidential information in strict confidence for a period of three (3) years from the date of receipt; provided, however, that the Parties shall maintain the strict confidence of any Confidential Information which may constitute a trade secret for so long as such Confidential Information remains a trade secret under applicable law. The Parties shall at all times exercise reasonable care to safeguard such Confidential Information.

3. The Parties agree only to disclose Confidential Information to those employees who need to know the Confidential Information and who have been informed of its confidential nature and who agree to be bound by confidentiality provisions covering such information which are at least as restrictive as those contained in this MOU.

4. NYSERDA is required to comply with the NYS Freedom of Information Law, Public Officers Law, Article 6. Section 87(2)(d) of that law provides for exemptions to disclosure for records or portions thereof that "are trade secret or are submitted to an agency by a commercial enterprise or derived from information obtained from a commercial enterprise and which if disclosed would cause substantial injury to the competitive position of the subject enterprise." Information submitted to NYSERDA that the disclosing party wishes to have treated as proprietary and confidential trade secret information should be identified and labeled "Confidential" or

"Proprietary" on each page at the time of disclosure. This information should include a written request to exempt it from disclosure, including a written statement of the reasons why the information should be exempted. See Public Officers Law, Section 89(5) and the procedures set forth in 21 NYCRR Part 501 (NYSERDA; http://nyserda.ny.gov/~/media/Files/About/Contact/NYSERDARegulations.ashx). By so marking such information, the disclosing party represents that information has actual or potential specific commercial or competitive value.

V. GENERAL TERMS

1. This MOU does not constitute a binding commitment by any Party to contribute resources of any nature, including data or funding or time, towards the initiatives discussed herein. No license under any intellectual property rights of any kind is granted or implied by disclosure of information hereunder.

2. Each Party is responsible for the costs of its participation in all activities carried out in the framework of this MOU, unless specified otherwise in writing. The Parties will separately fund any activities arising from their collaborative efforts. In no event shall any Party be liable to the other Party or its representatives for any special, indirect, punitive, exemplary, or consequential damages of any type, arising in contract, tort (including negligence, whether sole, joint, concurrent, or strict liability) or otherwise, arising out of this MOU.

3. This MOU shall not be construed as a teaming, joint venture or any other contractual relationship or as a settlement of any dispute or as creating any obligation to negotiate with respect to any of the foregoing.

4. This MOU contains the entire understanding between the Parties and may not be modified in any manner except by written amendment executed by the Parties. The Parties may, from time to time, specify any new or different address in the United States as their address by giving fifteen (15) days written notice to the other Party. The change of address shall not be considered as impermissible modification or amendment to this MOU.

5. This MOU may not be assigned by any Party.

6. In the event that any provision of this MOU shall be held invalid or unenforceable for any reason, that provision shall be ineffective to the extent of such invalidity or unenforceability and such invalidity or unenforceability shall not affect any other provision of this MOU.

7. No Party may use the other Parties' names, logos, trademarks, service marks, trade names, or refer to participation of an employee of the other Party by name or title, in any public release of information without the other Party's written consent.

8. The Parties have caused this MOU to be executed by their duly authorized representatives and is effective on the date of the last signature below.

VI. REPRESENTATIONS

1. The use, public performance, reproduction, distribution, or modification of the project results does not and will not violate the rights of any third parties, including, but not limited to, copyrights, trademarks, service marks, publicity, or privacy.

VII. LICENSES

1. ASHRAE shall be responsible for obtaining any necessary licenses to use any third-party content contained in materials developed by ASHRAE.

VIII. RESTRICTION ON USE

1. ASHRAE agrees that to the extent it receives or is given any information from NYSERDA or a NYSERDA contractor or subcontractor, ASHRAE shall treat such data in accordance with Section IV of this MOU and any restrictive legend contained thereon or instructions given by NYSERDA, unless another use is specifically authorized by prior written approval of the NYSERDA Project Manager.
2. ASHRAE acknowledges that in the performance of the Work under this Agreement, ASHRAE may come into possession of personal information as that term is defined in Section 92 of the New York State Public Officers Law. ASHRAE agrees not to disclose any such information without the consent of NYSERDA.

IX. PUBLICITY

1. ASHRAE shall collaborate with NYSERDA's Communications Department to prepare any press release, to plan for any news conference concerning the Work and any other marketing or publicity including but not limited to social media posts concerning the Work. In addition, ASHRAE shall notify NYSERDA's Director of Communications regarding any media interview in which the Work is referred to or discussed.

2. It is recognized that during the course of the Work under this MOU, ASHRAE or its employees may from time to time desire to publish information regarding scientific or technical developments made or conceived in the course of or under this Agreement. In any such information, ASHRAE shall credit NYSERDA's funding participation in the Project and shall state that "NYSERDA has not reviewed the information contained herein, and the opinions expressed in this report do not necessarily reflect those of NYSERDA or the State of New York." Notwithstanding anything to the contrary contained herein, ASHRAE shall have the right to use and freely disseminate project results for educational purposes, if applicable, consistent with ASHRAE's policies.

3. Commercial promotional materials or advertisements produced by ASHRAE shall credit NYSERDA, as stated above, and shall be submitted to NYSERDA for review and recommendations to improve their effectiveness prior to use. The wording of such credit can be approved in advance by NYSERDA, and, after initial approval, such credit may be used in subsequent promotional

materials or advertisements without additional approvals for the credit, provided, however, that all such promotional materials or advertisements shall be submitted to NYSERDA prior to use for review, as stated above. Such approvals shall not be unreasonably withheld, and, in the event that notice of approval or disapproval is not received by ASHRAE within thirty days after receipt of request for approval, the promotional materials or advertisement shall be considered approved. In the event that NYSERDA requires additional time for considering approval, NYSERDA shall notify ASHRAE within thirty days of receipt of the request for approval that additional time is required and shall specify the additional amount of time necessary up to 180 days. If NYSERDA and ASHRAE do not agree on the wording of such credit in connection with such materials, ASHRAE may use such materials, but agrees not to include such credit.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective duly authorized representatives.

NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

Signature:_____

Name:_____

Title:_____

Date:_____

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS

Signature:_____

Name: _____

Title: _____

Date: _____

Signature:_____

Name: _____

Title: _____

Date: _____

Proposed MOU

MEMORANDUM OF UNDERSTANDING

ASHRAE

AND

REHVA (FEDERATION OF EUROPEAN HEATING, VENTILATION AND AIR CONDITIONING ASSOCIATIONS)

****

REHVA is a Pan-European federation currently representing 27 member associations (with about 120 000 individual members) headquartered at 40 Rue Washington 1050, Brussels, Belgium. REHVA is dedicated to the improvement of health, comfort, safety and energy efficiency in all buildings and communities with the mission to advance HVAC technologies to adapt to climate change and high-quality engineering practice, to promote European standards, and act as the single voice of European HVAC designers and building services engineers by facilitating knowledge exchange, supporting the development of related EU policies and their national level implementation..

ASHRAE is an international individual membership organization (with about 57 000 individual members) headquartered at 1791 Tullie Circle Northeast, Atlanta, Georgia 30329, USA dedicated to serve humanity by advancing the arts and sciences of heating, ventilation, air-conditioning, refrigeration and their allied fields. ASHRAE engages input from its members worldwide and others to support research and develop standards for international application.

REHVA and ASHRAE have a long relationship of cooperation for over 50 years. ASHRAE has always had members in Europe and some of them, were and are highly integrated in the REHVA governance. Similarly, REHVA has had some individual members of their national associations highly integrated in ASHRAE governance.

The basis of this Memorandum of Understanding is the belief that by working together, both organizations can amplify their abilities to serve their members and the general public while simultaneously eliminating duplication and conflicts. Collaboration between ASHRAE and REHVA will also allow both organizations to address major issues facing our industry worldwide, including adapting to a rapidly evolving climate condition and technology in the framework of mutual information exchange. The natural outcome of elevating and magnifying membership value will be an increase in the communication, cooperation and collaboration between ASHRAE and REHVA.

Establishing the Relationship between REHVA and ASHRAE

Both entities enter into this MoU with the objective to start a new era of potential cooperation, by agreeing to build their cooperation scheme with mutual benefit.

In implementing this MoU, REHVA and ASHRAE will investigate collaborative activities related to ASHRAE and REHVA.

The intent of this MoU is to explore and enhance communication, cooperation and, where applicable, coordination between ASHRAE and REHVA, which recognizes the following levels:

- Global: between ASHRAE and REHVA at the Society and Board level respectively
- European regional: between ASHRAE Region XIV and REHVA
- Country: between the national association and the local ASHRAE chapter, group, section.
- Individual members: when they are member of REHVA national associations and ASHRAE

As a starting point, ASHRAE and REHVA seek to cooperate in the areas contained within the Annex 1.

ASHRAE and REHVA agree to work together in harmony at all levels.

To create a harmonious relationship and improve communication, the following regular meetings are envisioned:

- A meeting between REHVA and ASHRAE will be held yearly in conjunction with the ASHRAE Winter Conference.
- A meeting between REHVA and ASHRAE will be held yearly in conjunction with the REHVA General Assembly.
- Additional meetings may occur, either face-to-face or electronically, as conditions warrant.

The purpose of these meetings will be to:

- Ensure ongoing advancement and monitoring of collaborative projects underway.
- Keep each respective organization informed of on major or new initiatives.
- Discuss new opportunities for collaboration.

Development of international bodies

Each organization remains free to participate in any other international initiative with the same goal and will inform each other of its intention.

REHVA and ASHRAE agree to join efforts, in conjunction with other organizations, to help develop the Indoor Environmental Quality - Global Alliance (IEQ - GA).

Duration

This MoU will enter in force at the signature date executed and will cancel and replace the previous MoU. This MoU will terminate the 30th of June 2022, unless either ASHRAE or REHVA desires to negotiate a new MoU.

FOR ASHRAE
Darryl Boyce
ASHRAE President, 2019-2020

_____
Signature

_____
Date

FOR REHVA
Frank Hovorka
REHVA President 2019-2022

_____
Signature

_____
Date

ANNEX 1

An annual work plan will be developed under the principles of this MoU to define future joint initiatives of the following items:

- Events, publications and dissemination tools;
- Education and International Student Competition;
- Standards and policies;
- Research and Technical cooperation.

Final Report of the PEC Ad Hoc on Strategic Business Development

ASHRAE Annual Meeting – June 25, 2020

Strategic Business Development Ad Hoc

- Preliminary report made in Orlando
- Used a three-step process
  - Where are we today
  - Where do we want to be
  - How are we going to get there

A transformational change breaks the existing framework, is unbound by time and cannot be undone

Transformational Change #1

- Use a financial perspective to analyze and evaluate all ASHRAE products and services
  - Gross margin, in $ and %
  - Development cost
  - Time to recoup investment

You cannot cut your way to financial stability – You grow your way to financial stability

Existing ASHRAE Business Models

Revenues & Margins (SY 18-19)				
Category	**Total Revenue**	**% of Total**	**Gross Margin $**	**Gross Margin %**
Membership Dues	$ 8,151	28%	$ 1,470	18%
Exposition Income	$ 5,976	21%	$ 5,976	100%
Advertising Income	$ 4,074	14%	$ 145	4%
Publication Sales	$ 3,042	10%	$ 969	32%
Education	$ 1,870	6%	$ 149	8%
Certification	$ 226	1%	$ (141)	-62%
Meetings & Seminars	$ 1,589	5%	$ (846)	-53%
Contributions	$ 2,405	8%	NA	NA
Other	$ 1,711	6%	NA	NA
REVENUES	$ 29,044	100%		

Revenue – (Direct cost that varies with volume) - (Direct staff labor associated with product) =

Gross Margin

Transformational Change #1 – Action Items

Action Item #1 – Recommend that Finance Committee adopt the use of a single analysis form across all ASHRAE products and services to include gross margin dollars, gross margin %, payback and other suitable metrics.

Action Item #2 – Recommend that Finance Committee reconfigure their accounting system to automatically produce financial data, including gross margin dollars and %, for all products and services

Strategic Business Development Ad Hoc - Goals

	Publications	Advertising	Education	Certification	TOTAL
Actual Revenue	$ 3,042	$ 4,074	$ 1,870	$ 226	$ 9,212
Actual Gross Margin ($)	$ 969	$ 145	$ 149	$ (141)	$ 1,122
Actual Gross Margin (%)	32%	4%	8%	-62%	12%
Target Revenue Goal	$ 4,000	$ 4,100	$ 2,500	$ 500	$ 11,100
Target Gross Margin ($)	$ 1,280	$ 205	$ 800	$ 50	$ 2,335
Target Gross Margin (%)	**32%**	**5%**	**32%**	**10%**	**21%**

Three Additional Fundamental Changes

- **Fundamental Change #2** - Create a market-driven business model of product/service development that focuses on the needs and expectations of clients
- **Fundamental Change #3** - Integrate ASHRAE products across Council "boundaries" into a portfolio or "suite" of products that amplifies its value
- **Fundamental Change #4** - Develop a sales strategy to sell ASHRAE technology B2B in a digital world

How We Get There – Developing a Path

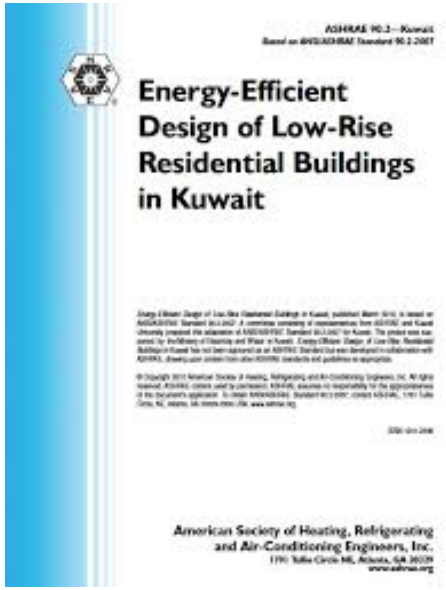
- Four separate work groups producing a "mini-business plan"
  - Training and certification
  - Digital Universe/Advertising
  - Building EQ
  - Royalties and Custom Codes
- Purpose of work groups is to produce a strategic path forward using a financial perspective
- Contained in Appendices B, C, D and E
- Presidential Ad Hoc on code and standard support services – Appendix F

Transformational Change #2

Create a market-driven business model of product/service development that focuses on the needs and expectations of clients

Transformational Change #2 - Examples

- Royalties and Custom Code Work Group
  - Assist in developing state and local codes
  - Help create Code compliance software
  - Licensing
- Presidential Ad Hoc on fee-based consulting services for codes and standards – BOD approved
  - Fee-based consulting services
  - Royalites



Transformational Change #2 – Action Items

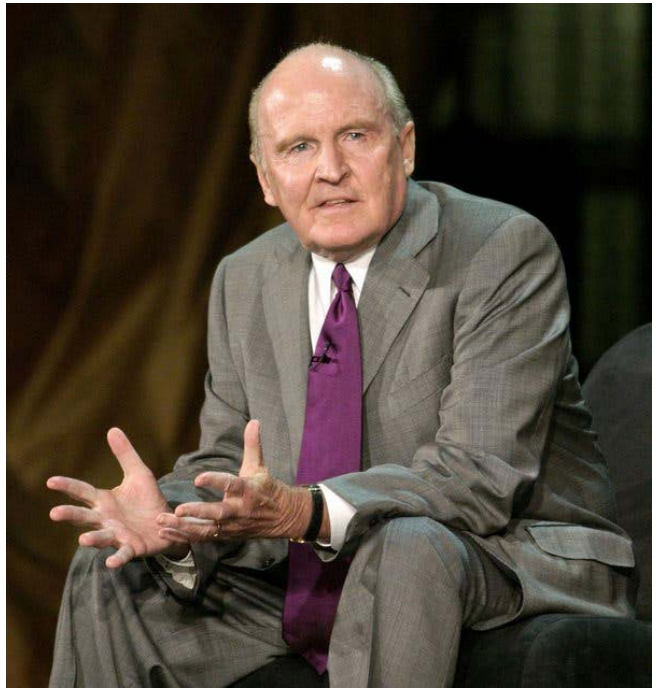
- Action Item #3 – Adopt a product/service planning process that is market driven. The process should be developed by a cross-Council team and include Marketing. To leverage ASHRAE strengths, the process should include the appropriate path(s) within ASHRAE to optimize the development and marketing of the product/service identified by the process.

"Build it and they will come" – Field of Dreams

Transformational Change #2 – Leveraged Strengths

- ASHRAE is outstanding at producing content
- ASHRAE's "sales force" of 57,000 members spanning 132 countries

- Develop a stable revenue stream
- Enhances stature and profile of ASHRAE
- Greater market penetration globally



"if you don't have a competitive advantage, don't compete" – Jack Welch, former CEO of GE

Transformational Change #3

Integrate ASHRAE products across Council “boundaries” into a portfolio or “suite” of products that amplifies its value

Transformational Change #3 - Examples

- Training and Certification Work Group – Focus on client needs
  - Training portfolios related to credentialing, micro-credentials and badging
  - Subscription services – Lower price point per time period generates a constant revenue stream
- Building EQ Work Group – Focus on client needs
  - Portfolio of products related to Building EQ, training, publications, badging and outreach
  - Customized portal for large users

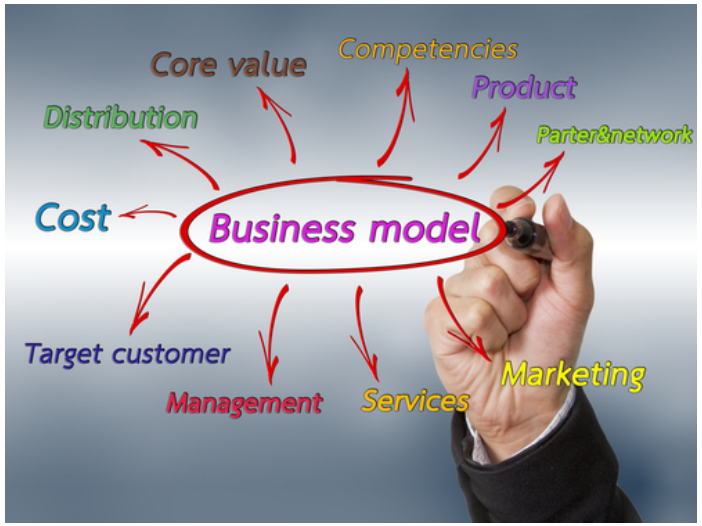
Transformational Change #3 – Action Items

- Action Item #4 – Align products and services across ASHRAE boundaries while simultaneously developing suites or portfolios of products to meet market needs. Alignment shall include addressing pricing and costs, along with coordinating regional and Society delivery of products and services.

"Dance of the silos"
President-elect Chuck Gulledge

Transformational Change #3 – Action Items

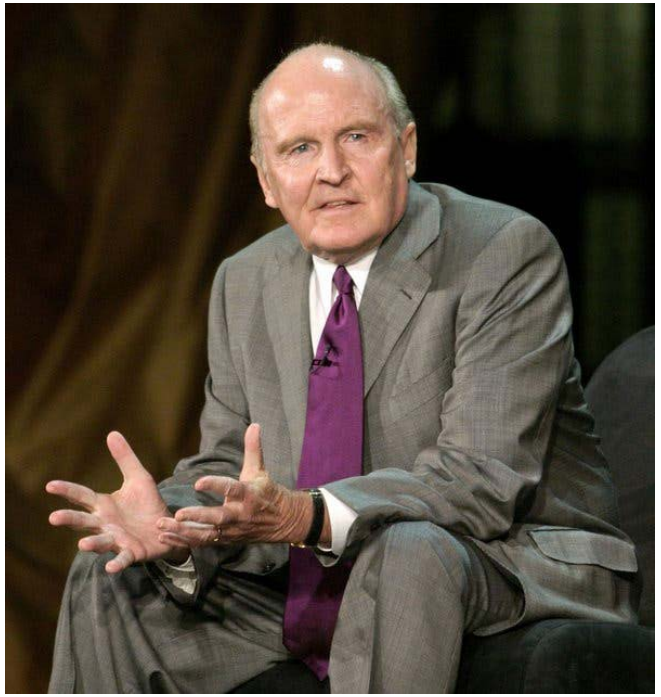
- Action Item #5 – Establish a PEC business model that includes governmental and non-governmental entities to deliver ASHRAE products. The business model should include the ability to scale our educational offerings, create revenue streams by licensing or selling ownership of products, hiring an ASHRAE contract officer and the investigation of potential partners.



Transformational Change #3 – Leveraged Strengths

- ASHRAE's wide diversity of product and services
- A "go to" reputation that creates a significant branding advantage

- Integrated, packaged products amplify value
- Potential to open new markets with new product portfolios



"An organization's ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage"

Jack Welch, former CEO of GE

Transformational Change #4

Develop a sales strategy to sell ASHRAE technology B2B in a digital world

Transformational Change #4 - Examples

- Digital World/Advertising Work Group – Focus on client needs
  - Must learn how to be compensated for deploying ASHRAE Technology online
  - Expand to an integrated online approach
  - Podcasts and Vidcasts
- Advertising is high-performing
  - Expand geographic markets
  - Sponsored editorial content
- B2B approach instead of B2C

Transformational Change #4 – Action Items

- Action Item #6 – Create a digital business plan for PEC by identifying 3 to 5 digital product strategies that are in response to market needs and try them, thus allowing PEC to learn which strategies work and which do not

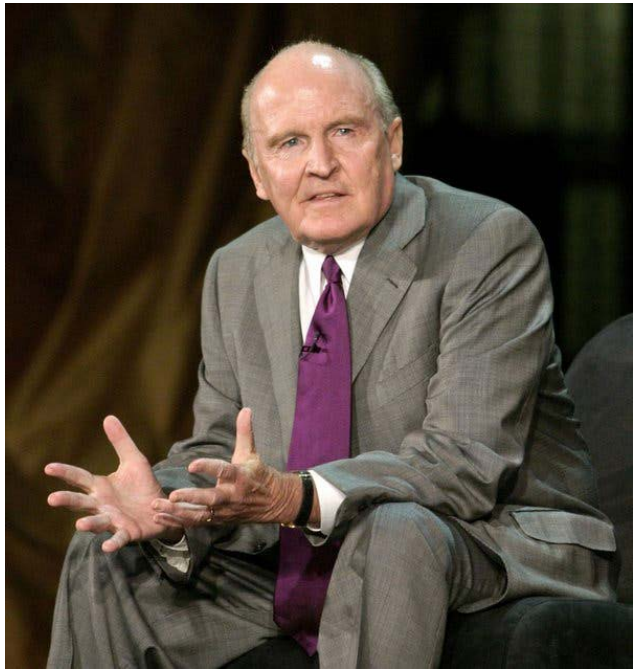
Transformational Change #4 – Action Items

- Action Item #7 – Implement a professional development program to allow staff to develop the skills and knowledge necessary to guide PEC volunteers on how to leverage and apply a digital format.

Transformational Change #4 – Leveraged Strengths

- Often the first contacted
- Current market focus on IEQ, health, safety, comfort and energy costs

- Greatly expand technology markets
- Compete over a wider spectrum



"Control your own destiny or someone else will"
Jack Welch, former CEO of GE

Summary

- We must change the way we look at products and services
- We must change how we do business
- Our future is a digital future
- We have a clear path forward
- Future for ASHRAE is very bright

With Much Thanks

- Steve Comstock
- Hugh Crowther
- Bill Dean
- Mark Owen
- Jon Symko
- Megan Tosh
- Alice Yates
- Craig Wright
- Farooq Mehboob, PEC Chair

ABSTRACT

While indoor smoking has become less common in recent years, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts. ASHRAE's role in providing engineering technology, standards and design guidance in support of healthful and comfortable indoor environments supports the need for this position document.

ASHRAE's position is that all smoking activity inside and near buildings should be eliminated, which is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects. ASHRAE recommends that building design practitioners educate and inform their clients, where smoking is still permitted, of the limits of engineering controls of ETS exposure, that multifamily buildings have smoking bans inside and near them, and that further research be conducted on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs and electronic nicotine delivery devices (ENDS), and engaging in other activities commonly referred to as e-cigarettes or vaping.

ASHRAE Position Document on Indoor Air Quality

Approved by ASHRAE Board of Directors
Month Day, 20XX

Expires
Month Day, 20XX

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COMMITTEE ROSTER

The ASHRAE Position Document on Indoor Air Quality was developed by ASHRAE's Indoor Air Position Document Committee formed on January 26, 2018, with Donald Weekes Jr. as its chair.

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HISTORY OF REVISION/REAFFIRMATION/WITHDRAWAL DATES

The following summarizes this document's revision, reaffirmation, or withdrawal dates:

1989 – BOD approves Position Document titled Indoor Air Quality

6/28/2001 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

2/10/2005 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

7/21/2011 – BOD approves revision to Position Document titled Indoor Air Quality

7/2/2014 – Technology Council reaffirms Position Document titled Indoor Air Quality

6/28/2017 – Technology Council reaffirms Position Document titled Indoor Air Quality

X/XX/20XX – BOD approved revision to Position Document titled Indoor Air Quality

Note: ASHRAE's Technology Council and the cognizant committee recommend revision, reaffirmation, or withdrawal every 30 months.

Note: ASHRAE position documents are approved by the Board of Directors and express the views of the Society on a specific issue. The purpose of these documents is to provide objective, authoritative background information to persons interested in issues within ASHRAE's expertise, particularly in areas where such information will be helpful in drafting sound public policy. A related purpose is also to serve as an educational tool clarifying ASHRAE's position for its members and professionals, in general, advancing the arts and sciences of HVAC&R.

ABSTRACT

It is ASHRAE's position that provision of ~~good~~ acceptable IAQ is an essential building service and that all decisions about buildings and heating, ventilating, and air-conditioning (HVAC) systems must consider the implications for IAQ. This position holds for all building types, including sustainable and resilient buildings where measures have been taken to reduce environmental impacts and energy use.

ASHRAE recommends further research on the impact of IAQ on people's health, comfort, well-being, learning outcomes and work performance, and continued development of the technologies needed to address IAQ in all types of buildings.

ASHRAE is committed to maintain and update IAQ standards and guidelines and to use its leadership position to promote research, education, and best practices in IAQ.

The appendix of this document provides evidence to support these positions, including the effects of IAQ on human health, comfort, well-being, learning outcomes and work performance, and the economic benefits of improved IAQ.

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Commented [SH1]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature.
All usages of the term were used and replaced throughout.

Commented [LL2]: Sleep performance not important?

Commented [SH3R2]: PDC left as is. Sleep is part of well-being which could bring in other aspects such as exercise, etc. not listed here.

Commented [SH4]: PDC felt 'work' should be kept. "Work performance".
These are terms used in literature of evidence used to make these recommendations

Commented [SH5]: See earlier comment on 'learning outcomes'

Commented [SH6]: See earlier comment on work and work performance

EXECUTIVE SUMMARY

Indoor air quality (IAQ) has long been a critical issue for ASHRAE and its members because of the connection to ventilation and other HVAC systems in buildings. ASHRAE's Standards 62.1 (commercial and institutional buildings) and 62.2 (residential buildings) intended to support acceptable IAQ have been the benchmarks for ASHRAE's members and others involved with IAQ (e.g., practitioners; contractors; industrial hygienists) since 1973. ASHRAE has been concerned with all aspects of IAQ through its Position Documents, other standards and guidelines, conferences, and other efforts.

ASHRAE's positions are that:

- IAQ impacts people's health, comfort, well-being, learning outcomes and work performance. Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
- The provision of acceptable IAQ is an essential building service and central to ASHRAE's purpose.
- Achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including efforts to improve building energy efficiency, sustainability and resiliency.
- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation should be included in educational programs.
- ASHRAE's IAQ standards should be adopted by building codes and regulations.

Commented [BWP7]: Should Std. 170 be mentioned? It is in the body of the PD.

Commented [SH8R7]: PDC decided not to include here. Concern is not less on special environments here in exec summary.

Commented [MHS9]: Does ASHRAE have 2nd class positions? All the positions should be listed here.

Commented [SH10R9]: These are copied from positions listed later in PD to comply with ASHRAE PD template.

Please refer to review comments below for discussion on changes

Commented [SH11]: See earlier comment on 'learning outcomes'

1. THE ISSUE

Indoor air is ~~a~~ the dominant pathway for exposure to airborne contaminants given that people spend the majority of their time indoors, and indoor air commonly contains numerous contaminants originating from both indoor and outdoor sources. Many of the contaminants impact health, comfort, well-being, learning outcomes and work performance. It is important that IAQ is considered in the design, construction and operation of buildings and HVAC systems. ASHRAE and its partners have long pursued improved IAQ through a range of activities.

2. BACKGROUND

This document contains a high level discussion of indoor air quality given that ASHRAE has published many informative documents related to indoor air quality such as the Handbook - ~~Previous versions of this position document went into great technical detail on a broad range of IAQ issues. These details are not included in this document because that information is now well covered in other ASHRAE publications such as the Handbook –~~ Fundamentals (particularly Chapters 9 through 12) and two IAQ guides: "Indoor Air Quality Guide – Best Practices for Design, Construction and Commissioning" and "Residential Indoor Air Quality Guide: Best Practices for acquisition, design, construction, maintenance and operation".

Additionally, many other important IAQ issues are not covered here, as there are separate Position Documents that cover specific topics including: ~~Airborne~~ Infectious Aerosols~~Diseases~~,, Environmental Tobacco Smoke, Unvented Combustion Devices and IAQ, Filtration and Air Cleaning, and Limiting Indoor Mold and Dampness in Buildings. Instead, this document focuses on recommendations in several broad areas including policy, research, and education related to IAQ.

2.1 Overview

An established and still growing body of literature, summarized in the Appendix of this document, has demonstrated that: (1) IAQ impacts occupant health, comfort, well-being and the ability to work and learn, and therefore, (2) improving IAQ will bring benefits at the societal and individual levels.

Indoor air quality (IAQ) refers to the types and concentrations of airborne contaminants found in buildings. And while there is no universally accepted definition of "good" IAQ, there are three widely accepted approaches to improving IAQ in buildings:

- **Source control**
  - Use building materials, furnishings, appliances, and consumer products with low contaminant emissions;
  - Minimize indoor contaminant sources caused by occupant activities;
  - Remove outdoor contaminants via filtration and air cleaning before they enter a building; and

Commented [MHS12]: Only one thing can dominate

Commented [SH13R12]: PDC made change suggested by MS

Commented [EJS14]: ASHRAE 62.1 has steered away from the use of "contaminants" when referring to sources. Not all emissions from indoor or outdoor air are harmful or unnatural. "Contaminant" denotes a substance that would not ordinarily be present or that is somehow harmful.

Commented [SH15R14]: PDC noted they've discussed before and confirmed to go with contaminants. This is OK and PD committee did not like any other terms better here

Commented [SH16]: See earlier comment on 'learning outcomes'

Commented [SH17]: PDC felt 'work' should be kept. "Work performance".
These are terms used in literature of evidence used to make these recommendations

Commented [BWP18]: I don't think this explanation is needed, but the reference to sources of more detailed information is fine.

Commented [HS19R18]: PDC agreed to changes as shown

Commented [EJS20]: change

Commented [SH21R20]: PDC made change.

Commented [HE22]: "Infectious Aerosols"

Commented [SH23R22]: PDC made change.

Commented [LL24]: Maybe "Elements"? Child grow up with more germs can have stronger immune system; Diversity of microbe maybe important for healthier air (see below). Do we know enough to narrow study those elements as only "contaminants"?
https://www.ncbi.nlm.nih.gov/books/NBK458819/

Commented [SH25R24]: PDC – Felt contaminants was best choice of word here.

Commented [HE26]: Unclear – "Remove contaminants from outdoor air being brought into the building"

Commented [SH27R26]: PDC agreed to change as shown.

  - Design, operate, and maintain building enclosures, HVAC systems, and plumbing systems to reduce the likelihood of moisture problems and/or quickly mitigate them when they happen.
- **Ventilation**
  - Ensure that clean ~~outdoor~~ air is delivered to occupied spaces in order to effectively dilute and remove contaminants emitted by indoor sources and that air is exhausted in the vicinity of localized indoor sources.
- **Air cleaning**
  - Use effective air cleaning technologies to remove contaminants from outdoor ventilation air and recirculated indoor air.

Cost-benefit analyses have estimated that the health and economic benefits of improved IAQ are far greater than the costs of implementing these improvements. Also, many strategies exist, and others continue to emerge, that can help achieve good IAQ with lower energy impacts. Ultimately, an integrated design approach that considers both IAQ and energy, in addition to other key aspects of building performance such as site impacts, water use and other environmental impacts, is required to achieve high performing buildings that are energy efficient and achieve good IAQ. For more information on integrated design in context of IAQ see the ASHRAE IAQ Design Guide.

Commented [MHS28]: The ASHRAE definition of ventilation does not require the air be outdoor—whatever that means. It requires that it be clean and suitable for dilution of indoor contaminants.

Commented [SH29R28]: PDC agreed and deleted outdoor

2.2 ASHRAE Activities in Support of IAQ

ASHRAE ~~promotes good~~ better ~~IAQ by providing~~provides technical resources, ~~coordinating~~ coordinates and ~~funding~~ funds research, ~~organizing~~ organizes conferences, and ~~educating~~ educates practitioners about IAQ. ASHRAE has also developed and continues to support standards, guidelines, and other resources related to improving IAQ. For example, ASHRAE promulgates the following ~~minimum~~ standards that specifically address IAQ:

- ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quali*ty. This Standard, first published in 1973, establishes minimum ventilation and other IAQ related requirements for buildings other than residential and health care. Its outdoor air ventilation rate requirements have been adopted into the International Mechanical Code and Uniform Mechanical Code, the two most common model building codes in the US. The standard is also referenced by most green building programs including LEED.
- ANSI/ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. This Standard, first published in 2003, covers residential buildings. Minimum ~~V~~ventilation requirements from this standard have been adopted into codes, including California's Title 24, and into LEED for Homes and the U.S. Environmental Protection Agency's (EPA) Indoor airPlus program.
- ANSI/ASHRAE/ASHE Standard 170, *Ventilation of Health Care Facilities*. Standard 170 brought together several documents used throughout North America into a single standard. It is now widely used in building codes for ventilation requirements in hospitals and other health care facilities.
- ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1, *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings*. Developed in conjunction with USBGC, the International Code Council and Illuminating

Commented [MHS30]: Not all these standards are for good IAQ. The 62s in particular targeted on **acceptable** IAQ not **good** IAQ as the lead to this paragraph implies.

Commented [SH31R30]: PDC – agreed to changes to 1st sentence as shown

Commented [MHS32]: It is important to note that these standards are minimum standards.

Commented [SH33R32]: PDC removed 'minimum' here and added to 62.1 & 62.2 below.

Engineering Society (IES), this standard provides IAQ requirements beyond those in Standard 62.1. The standard was developed to be adopted as part of voluntary green/sustainable rating systems, green building incentive programs, and local building regulations. The most recent version of the standard (2017) serves as the technical content of the 2018 International Green Construction Code.

In addition, ASHRAE has published a number of guidelines and design guides help practitioners achieve good IAQ in buildings, including:

- ~~ASHRAE Guideline 24, *Ventilation and Indoor Air Quality in Low-Rise Residential Buildings.* This Guideline is a companion document to standard 62.2 that expands beyond the standard's minimum requirements to discuss best practices and system design.~~
- ASHRAE *Indoor Air Quality Guide – Best Practices for Design, Construction, and Commissioning*. This Guide, resulting from a collaborative effort of six leading organizations in the building community, presents best practices for design, construction, and commissioning that have proven successful in other building projects. It provides information and tools that architects and design engineers can use to achieve an IAQ-sensitive building that integrates IAQ into the design and construction process along with other design goals, budget constraints, and functional requirements.
- ASHRAE *Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation*" addresses IAQ issues in residential buildings.
- ~~The ASHRAE Epidemic Task Force has recently published guidance initiated by the COVID19 pandemic, which can be found at http://www.ashrae.org/covid19~~

A more complete list of standards, guidelines, and other relevant ASHRAE publications is included in the Appendix of this document.

3. RECOMMENDATIONS

- ASHRAE holds the following positions: ~~(PDC suggested keeping as listed, not all bullets in exec summary)~~
  - ~~Good~~ IAQ ~~is essential for~~impacts people's health, comfort, well-being, learning outcomes ~~ability~~ and work performance. ~~It~~ Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
  - The provision of acceptable ~~good~~ IAQ is ~~thereby~~ an essential building service and central to ASHRAE's purpose.
  - Achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including

Commented [SH34]: PDC had question on if this was withdrawn.

From Mark Weber: 'SRS approved the withdrawal public review. Has to get approved by StdsC on June 26th first."

Still in bookstore and not on website list of withdrawn standards.

Commented [MHS35]: While the PDC did not consult this in the development of the PD, it should be included here. As it is a good and timely resource

Commented [SH36R35]: PDC agreed but will listed in the Appendix as it is a bit difference in nature than the other references listed here.

Commented [BWP37]: This appears to be a note that should be deleted.

Commented [SH38R37]: PDC – yes. Deleted.

Commented [EJS39]: Is the PDC expectation that this more detailed expansion of the two summary bullets be deleted? Perhaps this could be reordered so that each of these bullets fall under one or the other of the two in the Executive Summary.

Commented [SH40R39]: PDC – this was mistakenly left it. Deleted now. Intent is now to list positions here and co ...

Commented [MHS41]: This is a key problem. It cannot be ASHRAE's position that Good IAQ is essential. ...

Commented [SH42R41]: PDC - Delete 'good' change to 'IAQ impacts'.. ...

Commented [SH43]: See earlier comment on 'learning outcomes'

Commented [HS44]: BOD member Andres Sepulveda

Commented [SH45R44]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in ...

Commented [SH46]: PDC felt 'work' should be kept . "Work performance". ...

Commented [HS47]: Sepulveda comment Suggested "productivity" vs. work performance

Commented [SH48R47]: PDC – prefers work performance as a common term in much of referenced ...

Commented [SH49]: PDC agreed to replace 'good' with 'acceptable'

Commented [MHS50]: This sentence is a key and separate thought; it surely deserves its own bullet. ...

Commented [SH51R50]: PDC - deleted

Commented [LL52]: Max's comment?

Commented [SH53R52]: PDC – OK here

efforts to improve building energy efficiency, sustainability and resiliency.

- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation ~~shall~~ should be included in educational programs.
- ASHRAE's IAQ standards should be adopted by ~~national and local~~ building codes and regulations.

- ASHRAE recommends fundamental and applied IAQ research and standards development in the following areas:
  - The relationship of ventilation rates and contaminant concentrations to occupant health, comfort, well-being, learning outcomes and work performance.
  - Approaches to improving IAQ beyond dilution ventilation, e.g., air cleaning and ~~contaminant's~~ source control.
  - Development of tools to allow economic valuation of IAQ benefits for individual buildings and groups of buildings.
  - Development of monitoring and HVAC equipment to control IAQ by measurement of contaminant's ~~.concentration.~~
  - Development of diagnostics ~~diagnostic tools~~ for commissioning and maintenance of ventilation and related IAQ systems.
  - The role of IAQ in building sustainability and resilience.
  - Development of IAQ control systems and solutions that contribute to other building goals including reducing energy use and greenhouse gas emissions and supporting grid integration.
  - Research on new contaminants of concern and development of technologies and approaches to address them.

- ASHRAE is committed to:
  - Maintaining and updating IAQ standards, guidelines and handbooks;
  - Integrating principles of IAQ within its professional education programs
  - ~~Development~~ Advancement of IAQ research including tools and applications;
  - Using its leadership position to develop partnerships with international organizations to promote research, education, and best practices in IAQ.

Commented [MHS54]: Good is fine here.

Commented [MHS55]: Typo I assume. "Shall" is not appropriate for a recommendation

Commented [SH56R55]: PDC – yes, agreed to change

Commented [MHS57]: Not international or regional or contractual? Why specify at all?

Commented [SH58R57]: PDC – agreed to change

Commented [MHS59]: We are recommending other people do research in this area but we are not committed to doing it ourselves? Something is out of scale here

Commented [SH60R59]: PDC – no change here, suggestion to list ASHRAE's commitment to research added below

Commented [SH61]: See earlier comment on 'learning outcomes'

Commented [LL62]: Sleeping performance not important?work

Commented [SH63R62]: KPDC left as is. Sleep is part of well-being which could bring in other aspects such as exercise, etc. not listed here.

Commented [HS64]: Sepulveda comment

Commented [SH65R64]: PDC – prefers current language

Commented [HS66]: BOD member Andres Sepulveda

Commented [SH67R66]: PDC – could be more than concentrations – dose, quantity, etc.

Commented [HS68]: Sepulveda comment

Commented [SH69R68]: PDC – preferred current language to general terms vs. diagnostic tools, diagnostic procedures, etc.

Commented [SH70]: PDC approved MS suggestions here

4. REFERENCES

(editors to list references cited in PD here)

A. APPENDIX

This appendix summarizes the relevant literature supporting ASHRAE's IAQ Position Document and provides additional context for the positions and recommendations contained in that document.

A.1 What is indoor air quality?

For the purposes of this document, indoor air quality (IAQ) refers to the types and concentrations of contaminants in indoor air that are known or suspected to affect people's comfort, well-being, health, learning outcomes and work performance. Primary classes of these contaminants include particulate matter (both biological, including allergens, potential pathogens, and non-biological), organic gases (e.g., volatile and semi-volatile organic compounds), and inorganic gases (e.g., carbon monoxide, ozone, and nitrogen oxides). Other factors contributing to IAQ include water vapor and odors. Indoor concentrations of contaminants are influenced by outdoor concentrations, ventilation and infiltration, indoor emissions, and a number of other contaminant-specific source and sink mechanisms (e.g., deposition, chemical reactions, and air cleaning).

IAQ impacts humans by exposure to pollutants by inhalation, dermal and ingestion pathways. Personal and indoor exposures to many airborne contaminants are commonly higher than outdoor exposures (e.g., Meng et al., 2009; Morawska et al., 2013; Sexton et al., 2004; Wallace, 2000; Wallace et al., 1991, 1985), and the majority of human exposure to outdoor contaminants also typically occurs indoors (e.g., Asikainen et al., 2016; Azimi and Stephens, 2018; Chen et al., 2012, 2012; Logue et al., 2012; Weschler, 2006). These elevated exposures arise because of the large amount of time that people spend indoors (Klepeis et al., 2001) and because concentrations of many contaminants are higher indoors than outdoors (e.g., Abt et al., 2000; Adgate et al., 2004; Meng et al., 2005; Rodes et al., 2010; Wallace et al., 1991; Zhang et al., 1994).

While this appendix does not address hygrothermal conditions, the recommendations in the position document recognize the effects of temperature and moisture levels on IAQ through changes in contaminant emission rates, the growth of microorganisms on building surfaces, the survival of infectious pathogens in air and on surfaces, the survival of house dust mites (a source of allergens), people's perception of the quality of indoor air, and ultimately, the effects of moisture and moisture associated problems (e.g. mold, fungi or house dust mite) on the prevalence of building related symptoms.

A.2 How does IAQ impact health, comfort, well-being, learning outcomes and ~~work~~ performance?

IAQ impacts occupant health, comfort, well-being, learning outcomes and ~~work~~ performance (Jones, 1999; Spengler and Sexton, 1983; Sundell, 2004). There is a small but growing body of epidemiology literature that has specifically linked indoor

Commented [SH71]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature.
All usages of the term were used and replaced throughout.

Commented [HS72]: See earlier comment on work and work performance

Commented [HS73]: PDC – OK

Commented [SH74]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature.
All usages of the term were used and replaced throughout.

Commented [SH75]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature.
All usages of the term were used and replaced throughout.

contaminant exposures or sources to various adverse health outcomes, including but not limited to: combustion appliances (e.g., gas stoves) and respiratory illness in children (e.g., Garrett et al., 1998; Kile et al., 2014; Lanphear et al., 2001; Melia et al., 1977); VOCs and childhood asthma (e.g., Rumchev, 2004); chemical household products and respiratory symptoms in children (e.g., Sherriff, 2005) and asthma in adults (e.g., Zock et al., 2007); phthalates and asthma and allergy symptoms in children (e.g., Bornehag et al., 2004; Jaakkola and Knight, 2008; Kolarik et al., 2008); pet allergens and childhood asthma (e.g., Lanphear et al., 2001); radon exposure and lung cancer (Samet, 1989); airborne-transmitted infectious diseases such as pulmonary tuberculosis (TB) (Burrell, 1991), severe acute respiratory syndrome (SARS) (Li et al., 2007), COVID-19 (ASHRAE, 2020) and the common cold (Myatt et al., 2004); and carbon monoxide (CO) poisoning (Ernst and Zibrak, 1998); among others.

Some attempts have been made to quantify the burden of health effects associated with chronic (i.e., long-term) exposure to contaminants in indoor air. For example, Logue et al. (2011) and Logue et al. (2012) estimated the health impacts of long-term exposure to contaminants commonly found in U.S. homes using Disability Adjusted Life Years (DALYs) to establish a hierarchy of contaminants of concern. Similarly, Asikainen et al. (2016) estimated the annual disease burden caused by exposure to air pollutants in residential buildings in the European Union to be approximately 2.1 million DALYs per year, driven primarily by exposure to fine particulate matter (diameter ≤ 2.5 μm; $PM_{2.5}$) originating from outdoor sources, followed by $PM_{2.5}$ from indoor sources.

Additionally, excessive dampness or moisture in buildings is associated with a range of problems including mold, dust mites and bacteria; and exposure to damp environments is associated with respiratory problems including asthma (e.g., Heseltine et al., 2009; IOM, 2004; Kanchongkittiphon et al., 2014; Mendell et al., 2011). Indoor contaminants can act as respiratory irritants, toxicants, and adjuvants or carriers of allergens (Bernstein et al., 2008) and can adversely affect human productivity (Wargocki et al., 1999) and cause odor problems. Recent evidence has also suggested that pollutants in indoor air may reduce cognitive function (Allen et al., 2016; Satish et al., 2012).

One of the most common health complaints is the occurrence of building-related symptoms including eye, nose, and throat irritation, difficulty in concentrating and thinking clearly, headaches, fatigue and lethargy, upper respiratory symptoms, and skin irritation and rashes, as well as overall poor well-being (e.g., Bluyssen et al., 1996; Mendell, 1993; Mendell and Smith, 1990; World Health Organization, 1983). The term "sick building syndrome" ("SBS") has been used to describe the excess prevalence of these symptoms, without attribution to specific pathogens or illnesses or building characteristics, and is viewed as more informative than building-related symptoms (Redlich et al., 1997). The term "building-related illness" refers to diseases including hypersensitivity pneumonitis and Legionnaires' disease, which are associated with specific exposures to pathogens and other contaminants in a building (Bardana et al., 1988).

A.3 What are effective ways to improve IAQ?

The foremost approach to improving IAQ is source control both indoors and outdoors (Carrer et al., 2018; Nazaroff, 2013). Reducing or minimizing indoor contaminant sources can be achieved through selection of construction materials, furnishings, and maintenance products with low emission rates, restricting occupant use of fragranced or scented products (Steinemann et al., 2011), and minimizing the emissions from human activities for example by installing "walk-off" mats (Farfel et al., 2001; Layton and Beamer, 2009). Another form of source control is local exhaust ventilation, which removes contaminants before they have the opportunity to mix within occupied spaces, such as for residential cooker/range hoods (Delp and Singer, 2012; Lunden et al., 2015), and wet spaces, e.g., bathrooms and laundry rooms.

One element of source control is to keep buildings dry, for example by minimizing indoor sources of water vapor through source control and the control of moisture using humidifiers and dehumidifiers, as well as by designing and constructing building enclosures and HVAC systems to limit moisture problems (ASHRAE, 2018a, 2009; Heseltine et al., 2009). Episodic water events that invariably happen (e.g., floods, leaks, etc.) must be managed rapidly and effectively to prevent water damage and sustained dampness.

After effective source control, ventilation is used to dilute indoor contaminants with clean outdoor air. Literature reviews show that increasing ventilation rates led to improved health outcomes (e.g., Carrer et al., 2015; Sundell et al., 2011). Using ventilation to improve IAQ should also include minimizing the entry of contaminants from outdoors in polluted ambient environments (e.g., Liu and Nazaroff, 2001; Singer et al., 2016; Stephens et al., 2012; Stephens and Siegel, 2012; Walker and Sherman, 2013), (for example by reducing enclosure leakage or effectively filtering the outdoor air supply).

The third strategy, after source control and ventilation, is to clean indoor air via particle filtration and gaseous air cleaning. The ASHRAE Position Document on Filtration and Air Cleaning (ASHRAE, 2018b) and the U.S. Environmental Protection Agency's Guide to Air Cleaners in the Home (US EPA, 2018) both address many important issues related to filtration and air cleaning, as do recent literature reviews (e.g., Fisk, 2013; Zhang et al., 2011). For example, particle filters have been shown to reduce indoor concentrations of airborne particles and some empirical evidence shows that their use can have positive impacts on health. Some sorbent air cleaners have been shown to effectively reduce concentrations of gaseous contaminants, albeit with minimal empirical data on their impacts on health.

The complex relationship between IAQ and external environmental conditions, coupled with the effects of climate change, necessitates a shift towards designing and operating buildings that are not only comfortable and healthy for the occupants but are also sustainable. It is generally believed that achieving good IAQ can only result with increased energy consumption. However, many strategies exist that can both secure high IAQ and reduce energy use, including increased envelope airtightness, heat

recovery ventilation, demand controlled ventilation, and improved system maintenance (Persily and Emmerich, 2012). Additionally, more dynamic ventilation strategies are being developed that allow time shifting and other variable ventilation strategies such as smart ventilation (e.g., Rackes and Waring, 2014; Sherman et al., 2012; Sherman and Walker, 2011).

A.4 What are the economic costs and benefits of improving IAQ?

Socio-economic costs of air pollution can be substantial (Asikainen et al., 2016; Boulanger et al., 2017; Jantunen et al., 2011). Providing improved IAQ is estimated to have substantial economic benefits (e.g., Aldred et al., 2016a, 2016b; Bekö et al., 2008; Brown et al., 2014; Chan et al., 2016; Fisk et al., 2012, 2011; Fisk and Chan, 2017; MacIntosh et al., 2010; Montgomery et al., 2015; Rackes et al., 2018; Zhao et al., 2015). The economic benefits accrue from having higher worker productivity (e.g., Allen et al., 2016; Wargocki and Wyon, 2017), improved learning (e.g., Haverinen-Shaughnessy et al., 2011; Wargocki and Wyon, 2013), lower absentee rates (e.g., Milton et al., 2000), and reduced healthcare costs. In workplaces, measures that result in only small improvements in performance or absence will often be cost effective because, in developed countries, employee costs (e.g. salaries, health benefits) far exceed the costs of maintaining good IAQ (Wargocki et al., 2006; Woods, 1989). Additional economic benefits are possible through reduced maintenance costs and avoidance of IAQ investigations and remediation measures by designing, constructing, and operating buildings in a manner that reduces the likelihood of serious IAQ problems, such as widespread dampness and mold.

Several studies that have estimated the costs and benefits of improved source control, ventilation, and air-cleaning technologies are summarized below:

Source Control: Wargocki and Djukanovic (2005) estimated the costs associated with improving IAQ by reducing the load of pollution sources in a hypothetical building. The additional investments in energy, HVAC first costs and maintenance costs, and building construction costs were highly cost effective, with payback times below ~~2~~ two years and an estimated return on investment that was ~~4~~four to ~~7~~ seven times higher than the assumed interest rate of 3.2%. However, no specific analysis was conducted to estimate how much of these effects can be attributed to source control and how much to increased ventilation rates. Asikainen et al. (2016) estimated that a 25% reduction in indoor $PM_{2.5}$ sources, a 50% reduction in indoor VOCs and dampness, and a 90% reduction in radon, carbon monoxide, and second hand smoke in residential buildings in the European Union could reduce the burden of disease associated with residential indoor air exposures by approximately 44%.

Ventilation: Fisk et al. (2011) estimated that the combined potential annual economic benefit of implementing a combination of IEQ improvements in U.S. offices (including increasing ventilation rates, adding outdoor air economizers, eliminating high indoor temperatures during winter, and reducing dampness and mold problems) is

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approximately $20 billion per year. Similarly, Fisk et al. (2012) estimated that the economic benefits of increasing minimum ventilation rates in U.S. offices far exceed energy costs and that adding economizers would yield health, performance, and reduced absence benefits while saving energy. Dorgan et al. (1998) estimated the costs of improving ventilation in 40% of office buildings in the US considered unhealthy i.e. not meeting standard 62.1; the payback time of such activity was estimated to be below 1.4 years because of benefits for health and work performance resulting from it. Rackes et al. (2018) introduced an outcome-based ventilation framework for assessing performance, health, and energy impacts to inform ventilation rate decisions in U.S. office buildings and estimated that the economic benefits of increased ventilation rates in offices are routinely greater than additional energy costs or adverse health costs associated with introducing more outdoor contaminants through increased ventilation.

Filtration and air cleaning: Bekö et al. (2008) estimated that the health and productivity benefits of higher-performance filters would exceed their costs by well over a factor of 10 in an example office building. Montgomery et al. (2015) estimated benefit-to-cost ratios of up to 10 for improved filtration in office buildings in a variety of cities. Fisk and Chan (2017) similarly estimated benefit-to-cost ratios ranging from ~~3~~ three to 133 for the use of filters and/or portable air cleaners in both residences and commercial buildings. In all of the above studies, the avoided health care costs were the largest benefit of air cleaning. These and other studies on the costs and benefits of filtration and air cleaning were reviewed in Alavy and Siegel (2019).

Limited interview-based studies of decision-makers in the building industry in the U.S. have shown that they tend to underestimate the positive impacts of ventilation and filtration upgrades while overestimating costs (Hamilton et al., 2016). These findings suggest the need for educational activities to inform the industry on the costs and benefits of achieving good IAQ.

A.5 Summary

It is clear from the work cited in this appendix that IAQ in buildings is an essential building service that is vitally important to building occupants, owners, and designers, and therefore to ASHRAE. The health and economic impacts of IAQ are significant, and it is therefore essential to consider IAQ in all phases of building planning, design, and operation. Current design approaches and technologies include meeting minimum requirements (e.g., for ventilation as provided by ASHRAE Standards 62.1 and 62.2) and following guidelines for beyond-minimum performance (e.g., the ASHRAE IAQ design guides).

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REPORT TO THE BOARD OF DIRECTORS
From Technology Council
As of June 29, 2020

Recommendations for Board Approval:

NOTE: The publication motions presented below are addenda that have unresolved objectors, negative project committee votes with reason, or a threat of legal action. These motions are preceded by formally voted recommendations from the project committees and Standards Committee. The rules do not require a vote from Technology Council. Appeals procedures now allow for consideration of an appeal of a BOD standards action or inaction only if the negative vote or unresolved comment is based solely upon procedural grounds. A reminder to Board members – members are to review these motions for adherence to ASHRAE's Procedures for Standards Actions (PASA) and ANSI Essential Requirements and not technical content. If the BOD disapproves a Standards Committee Document for publication, please minute the detailed reason(s) for the record.

A summary of any unresolved commenters and/or negative project committee votes on these publication drafts is included in the analysis sheets that were distributed prior to the meeting.
By default, all Standards Committee Documents will be processed by our ANSI Audited Designator procedures unless otherwise indicated by the Board. In all cases, the fiscal impact for publication drafts is within existing budgets.

Consent motions 1 - 11 have unresolved commenters or negative project committee votes but no negative votes by Standards Committee. The reasons for the negative votes were technical in nature with no alleged process violations subject to appeal. Please refer to the analysis sheets for the full detail on the reasons for negative votes and/or unresolved commenters and a summary of Project Committee responses that were distributed prior to the meeting.

STANDARDS PUBLICATION MOTIONS

1. Standards Committee recommends that BSR/ASHRAE Addendum *b (filter removal efficiency)* to ANSI/ASHRAE Standard 52.2-2017, *Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size*, be approved for publication.

   StdC VOTE: 24-0-1[1], CNV

2. Standards Committee recommends that BSR/ASHRAE Addendum *c (thermal environmental control classification)* to ANSI/ASHRAE Standard 55-2017, *Thermal Environmental Conditions for Human Occupancy*, be approved for publication.

   StdC VOTE: 24-0-1[2], CNV

3. Standards Committee recommends that BSR/ASHRAE/IES Addendum *by (Renewables Requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

[1] Bob Burkhead abstained because he is a member of the SSPC.
[2] Larry Schoen abstained because he is a member of the SSPC.

StdC VOTE: 22-0-3[3], CNV

4. Standards Committee recommends that BSR/ASHRAE/IES Addendum *ck (adds renewable requirements)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 22-0-3[4], CNV

5. Standards Committee recommends that BSR/ASHRAE/IES Addendum *cp (Appendix G Renewables)* ANSI/ASHRAE/IES Standard 90.1-2019, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 22-0-3[5], CNV

6. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *m (Hot Water Distribution)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 21-0-4[6], CNV

7. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *t (compliance requirements)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 21-0-4[7], CNV

8. Standards Committee recommends that BSR/ASHRAEI/ICC/USGBC/IES Addendum *z (Source Energy Conversion Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 21-0-4[8], CNV

9. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *aa (CO_2e Emissions Factors)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 21-0-4[9], CNV

10. Standards Committee recommends that BSR/ASHRAE/ICC/USGBC/IES Addendum *ah (Dwelling Unit Lighting Efficacy)* to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, be approved for publication.

StdC VOTE: 21-0-4[10], CNV

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[3] Jonathan Humble, Christian Taber and Craig Wray abstained because they are current or recent past members of the SSPC.
[4] Jonathan Humble, Christian Taber and Craig Wray abstained because they are current or recent past members of the SSPC.
[5] Jonathan Humble, Christian Taber and Craig Wray abstained because they are current or recent past members of the SSPC.
[6] Dru Crawley, Jonathan Humble, Larry Schoen, and Christian Taber abstained because they are members of the SSPC.
[7] Dru Crawley, Jonathan Humble, Larry Schoen, and Christian Taber abstained because they are members of the SSPC.
[8] Dru Crawley, Jonathan Humble, Larry Schoen, and Christian Taber abstained because they are members of the SSPC.
[9] Dru Crawley, Jonathan Humble, Larry Schoen, and Christian Taber abstained because they are members of the SSPC.
[10] Dru Crawley, Jonathan Humble, Larry Schoen, and Christian Taber abstained because they are members of the SSPC.

11. Standards Committee recommends that BSR/ASHRAE Standard 221P, *Test Method to Field-Measure and Score the Cooling and Heating Performance of an Installed Unitary HVAC System*, be approved for publication.

StdC VOTE: 22-1[11]-2[12], CNV

Consent Motions 12 and 13 address the development of a new ASHRAE Standard and the continued promotion and recognition of June 26th as World Refrigeration Day.

12. Standards Committee recommends that the following Title, Purpose and Scope (TPS) be approved and that a new Standard Project Committee be formed:

TITLE: CDL - A Control Description Language for Building Environmental Control Sequences

PURPOSE:
The purpose of this standard is to define a declarative graphical programming language for building environmental control sequences that is both human and machine readable, designed for specification, implementation through machine-to-machine translation, documentation, and simulation.

SCOPE:
This standard applies to building automation systems controlling environmental systems such as mechanical systems, active facades, and lighting.

BACKGROUND: The purpose of this standard is to make CDL an open protocol, complementary to ANSI/ASHRAE Standard 135, *BACnet: A Data Communication Protocol for Building Automation and Control Networks*, and Standard 223P, *Designation and Classification of Semantic Tags for Building Data,* with the expectation that it will eventually be maintained by a Standing Standards Project Committee. PPIS assigned TC 1.4, Control Theory and Application, as the cognizant committee. Paul Ehrlich was recommended as the Chair of the proposed new project committee. There are at least five members willing to volunteer.

StdC VOTE: 25-0-0, CNV

13. Technology Council recommends that ASHRAE officially recognize and promote annually June 26th as World Refrigeration Day to serve as a means of raising awareness and understanding of the important contribution that refrigeration, air conditioning, and heat pumps make globally across many aspects of modern life and society.

BACKGROUND: The Refrigeration Technology Committee for Comfort Process and Cold-Chair recommended that ASHRAE continue recognizing and promoting World Refrigeration Day.

Fiscal impact: No additional impact

TechC Vote: 13-0-0, CNV

[11] Craig Wray voted no stating, there were no serious efforts to resolve commenters and the committee needs to have more discussion to resolve differences.
[12] Mike Woodford and Christian Taber abstained.

Consent Agenda Motions 14 and 15 address approving the revised Environmental Tobacco Smoke Position Document and the Indoor Air Quality Position Document for publication.

14. Technology Council recommends that the Board of Directors approve and publish the revised *Environmental Tobacco Smoke Position Document* as shown in Attachment A.

BACKGROUND: The BOD approved title, purpose and scope (TPS) is included as Attachment B. This revised PD was sent to Document Review Subcommittee, Tech Council and the BOD on May 31st and remains unchanged since then. The current PD expires 6/26/2021.

TechC Vote: 13-0-0, CNV

15. Technology Council recommends that the Board of Directors approve and publish the revised *Indoor Air Quality Position Document* as shown in Attachment C.

BACKGROUND: The BOD approved title, purpose and scope (TPS) is included as Attachment D. A version of this revised PD was initially sent to DRSC/Tech Council/BOD on May 28th and again with revisions to address review comments on June 23rd. Attachment C matches what was sent with one change highlighted in the Abstract. The current PD expires 6/28/2020.

TechC Vote: 13-0-0, CNV

Consent Agenda Motions 16 and 17 address approving revisions to Rules of The Board 2.406.01, *Membership,* and Rules of the Board 1.300, *Position Documents and Public Policy Issue Briefs*

16. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 2.406.01.1 be revised as shown:

2.406.01 MEMBERSHIP

2.406.01.1 Composition
The members of this committee are as follows:

A. Maximum of fifteen (15) voting members, including a chair and vice chair.~~:~~

B. Voting members shall include at least:
1. a past member of the Standards Committee.
2. One past member of the Research Administration Committee (Research Liaison for 2.0,4.0,. or 5.0)
~~-~~3. one past chair of a technical committee involved in environmental health or indoor air quality issues.
4 one member from outside the U.S. and Canada
5. two Health Professional (such as an industrial hygienist, physician, an epidemiologist, or a public health official.)
6. a past Society officer who has recently served in that capacity.
(85-06-27-58/86-06-22-22/98-01- 16-16/07-03-02-6B/18-06-27-20)

C. Non-voting members include a Board ex-officio member~~,~~ and a coordinating officer~~, and immediate past chair~~. (15-07-02-18)

BACKGROUND: These changes remove the requirement that the immediate past chair of EHC be included on the committee as a non-voting member. While the immediate past chair was to be included as a non-voting member during the nomination period this has not been done. This removes the requirement.

TECH C VOTE: **13-0-0, CNV**

17. Tech Council recommends to the BOD, that the ASHRAE Rules of the Board 1.300, *Position Documents and Public Policy Issue Briefs*, be revised as shown:

Definitions

An ASHRAE Position Document is a BOD-approved document expressing the views of the Society on a current issue of importance to ASHRAE and its members. It includes a concise summary statement as well as supporting documentation, analysis and/or rationale, and recommendations. Position Documents are automatically withdrawn if not reaffirmed or revised within 36 months of issue. Each version of a Position Document will contain the expiration date on the cover.

An ASHRAE Public Policy Issue Brief (PPIB) is a one-page brief on current relevant legislative/regulatory issues that are of interest to ASHRAE. An Issue Brief is developed by the Government Affairs Committee and approved by the Executive Committee (ExCom). Each version of an Issue Brief will contain the statement, "This version expires one year after the date of approval." (07-01-31-23B)

Initiation: Any ASHRAE officer, member, committee or council, or any responsible outside entity may suggest issues for which an ASHRAE Position Document or Public Policy Issue Brief should be developed or may suggest whether existing ASHRAE documents should be revised, withdrawn, or rescinded.

a) Position Documents ~~R~~requests should be sent to the Technology Council chair for consideration. Position Documents ~~and Public Policy Issue Briefs~~ are produced using the procedures and forms located in the Technology Council MOP. Position Documents are evaluated by Technology Council at intervals not to exceed 30 months.

b) Public Policy Issue Brief requests are sent to Government Affairs Committee for consideration. Government Affairs Committee shall make recommendations to create a new PPIB; re-affirm, amend, or expire and remove existing PPIBs. PPIB's are developed using the procedures located in the Government Affairs Committee MOP. PPIBs are evaluated by Government Affairs Committee at intervals not to exceed 12 months.

1.300.003 Approval (14-07-02-29)

1.300.03.1 Technology Council recommends publication of Position Documents including changes, to the Board of Directors for approval.

1.300.03.2 Technology Council approves re-affirmation or withdrawal of Position Documents and reports to the Board of Directors for information.

1.300.03.3 The Board of Directors acts on Technology Council recommendations for publication of Position Documents) (14-07-02-29)

1.300.03.4 After review and approval by ~~With the recommendation of (or after satisfactory review by)~~ Technology Council, ~~PPIBs~~ Public Policy Issue Briefs shall be ~~approved by~~sent to ExCom for approval. Upon ~~with information~~ approval, information copies shall be forwarded to the Board of Directors, Members Council and Technology Council.

1.300.04 **Archiving, Publication and Distribution** (12-06-27-19/12-10-26-11) 1.300.004.1 Position Documents

A. The Technology Department shall maintain information concerning the history of development and approval of Position Documents.

B. The Publications and Education Department shall be responsible for final editing, publication and distribution of Position Documents.

C. Current Position Documents will be posted on the ASHRAE website for free download.

D. Technology Council shall maintain the current list of Position Documents on the ASHRAE website.

1.300.004.2 Public Policy Issue Briefs (17-06-28-11)

A. Government Affairs Committee shall manage the current list of Public Policy Issue Briefs by evaluating each at least on an annual basis and formally decide to re-affirm, amend, or let expire and remove, each brief, subject to the approval of the Executive Committee.

B. The ~~Publications and Education Department~~ Government Affairs Committee shall be responsible for archiving, publication and distribution of Public Policy Issue Briefs.

(end of 1.300 and end of Volume 1)

BACKGROUND: Public Policy Issue Briefs (PPIB's) are one-page documents that succinctly explain ASHRAE's position on certain issues. They are used mainly for those involved in Government Activities to communicate important ASHRAE policy to lawmakers. Often, the PPIBs summarize positions found in ASHRAE Position Documents which have already followed a rigorous collaboration and approval process. The guidance currently found in the ROB divides the development, approval, and publication between GAC, Tech Council, ExCom and Pub Ed. The path for the initiation, development and approval process has unclear, time consuming gaps.

The proposed ROB change will clearly give GAC full responsibility for writing and renewing PPIB's and the approval process to Tech Council and ExCom. Considering that PPIB's must be reaffirmed, revised, or withdrawn one year after its approval date, it is very important to have a streamlined process. Technology Council Document Review Subcommittee coordinated with the Government Affairs Committee in revising these rules. Technology Council and Government Affairs Committee have also coordinated on the necessary changes to their MOPs and Reference Manuals to reflect these changes.

TechC Vote: 13-0-0, CNV

Motions 18 addresses a motion from Tech Council to request the Board of Directors approve a previously considered motion for publication of 62.2 a (unvented combustion appliances) to ANSI/ASHRAE Standard 62.2-2019.

18. Technology Council recommends to the BOD that BSR/ASHRAE addendum *a* (*unvented combustion appliances)* to ANSI/ASHRAE Standard 62.2-2019, *Ventilation and Acceptable Indoor Air Quality,* be approved for publication.

BACKGROUND: At the Kansas City Annual Conference Standards Committee approved the publication of addendum a to Standard 62.2-2019 (See Attachment E, Standards Analysis Sheet) and presented it to the Board of Directors for approval. The Board disapproved the addendum and sent it back to Standards Committee. Standards Committee requested reasons for the negative votes and was informed that while no specific written reasons were submitted the Board did not believe that process had been followed. At the Orlando Winter Conference Standards Committee discussed the addendum and determined that the appropriate action was to form an ad hoc. The Standards Committee reported as in information item to Tech Council and it is documented in the Orlando minutes the following:

> Standards Committee reviewed the background and documentation related to addendum a to 62.2 (unvented combustion heaters). A motion on this topic was postponed until the spring Standards Committee meeting and an Ad Hoc Committee, to be chaired by Wayne Stoppelmoor, has been tasked with reviewing the issues and whether or not there were sufficient efforts to resolve objections and whether or not technical issues were afforded due process.

It was reported by the Standards Committee Chair that the Ad Hoc felt they should determine if a compromise position could be made that would satisfy the objectors and SSPC 62.2. Concurrently the Environmental Health Committee (EHC) took up a motion to approve the addendum for publication, but the motion was postponed pending the work of the Standards Committee Ad Hoc.

The EHC position was that contamination from unvented combustion appliances is an important factor in indoor air quality. The Society has taken positions on this topic in the "Unvented Combustion Devices and IAQ" Position Document (re-affirmed 1/23/2018) which are supported by this proposed change.

The Board of Directors has previously approved this addendum in 2017, but it was returned on appeal. The SSPC redid a specific piece of the process but there was no technical changes to the addendum. The Board rejected the addendum in 2019 without providing a reason back to the Standards Committee to share with the SSPC.

The Standards Committee Ad-Hoc reviewed the addendum including actions taken by the SSPC and with the help of the current and past chair of SSPC 62.2 and the objectors came up with a compromise proposal to send to the SSPC. At their virtual summer meeting, SSPC 62.2 considered a slightly modified version of the compromise proposal and is currently conducting a continuation letter ballot. There are negative votes with reason being submitted, however; it appears that this addendum will be approved by the SSPC to go to the Standards Project Liaison Subcommittee of Standards Committee for approval for publication public review. The reasons are dissatisfaction with not receiving reasons for the original addendum being approved and some are for technical reasons.

Concurrently with the vote for the compromise addendum, SSPC 62.2 also approved a letter to the ASHRAE Board that requested the Board reconsider approving Addendum a OR provide feedback on why addendum a was disapproved by the Board Standards Committee has not seen the letter but did discuss it and the consensus that this is a moot point given the compromise solution. Standards Committee noted that a there .needs to be changes in the future so that project committees understand the reasons the Board disapproves a Standards Committee Document for publication.

If this addendum is approved a right to appeal letter will be sent to the unresolved objectors. The addendum can not be published during the appeals period or while appeals are being considered up through ANSI appeals absent the approval of the Society President. The compromise addendum being considered by the SSPC would likely have to be postponed

until the appeals process of 62.2*a* was concluded since it would be modifying 62.2*a* or the compromise addendum would need to be modified to reflect what is currently in the published standards and addenda to 62.2.

TechC Vote: 11-1-1[13], CNV

INFORMATION ITEMS:

1. Update on Report of the Presidential ad hoc Committee on ASHRAE's Role in the Globalization of Standards

    a. In addition to recommending that Standards be made available for free over the internet, ILS/ISAS discussed the possibility of recommending that the ILS/ISAS subcommittee report to Technology Council rather than Standards Committee in order to increase the visibility of International Standards Activities within the Society.

    b. ILS/ISAS and ASHRAE staff have established a procedure for ASHRAE PCs/TCs to request copies of ISO Standards from the MOS-I for the purpose of harmonization with ASHRAE standards.

2. Revisions to the Procedures for ASHRAE Standards Action (PASA) previously approved by the Board of Directors were approved by ANSI in April 2020. One of the major PASA changes related to clean policy level documents/addenda (no unresolved objectors and no threat of legal action) now being eligible for fast track processing and approval by staff for publication. This is an effort to speed up the standards development process. The Policy Procedures and Interpretation Subcommittee continues to review the procedures for additional improvements.

3. The new Research Advisory Panel (RAP) is making good progress. Now that a new Strategic Plan for the Society has been completed, RAC took steps this Society year to form a new RAP (Research Advisory Panel) so that the Society's new Research Strategic Plan can also be developed and launched within the next three years. The Chair of RAP is Reinhard Radermacher and panel members include Pawel Wargocki, Chris Wilkins, Larry Markel, Eckhard Groll, Chun-cheng-Piao, Chad Kirkwood, Agami Reddy, Dawen Lu, and Kishor Khankari. Presidential Member Bjarne Olesen is also attending meetings to monitor progress.

4. Technology Council approved the reaffirmation of *Responsible Use of Refrigerants* Position Document and the *Unvented Combustion Devices and Indoor Air Quality* Position Document.

5. Technology Council made changes to its Manual of Procedures that will go to the Society Rules Committee for review and approval.

Respectfully Submitted,

[13] Rick Hermans voted against the reconsideration of this publication because the objectors to the addendum and negative votes at the Standard Committee were, in my mind, persuasive. The effect of this addendum is to outlaw an entire class of heating product in residences and this is not the purview of our Society. The PC has worked a long time on this subject but has, again in my opinion, not given serious consideration to the offers of compromise by the objectors throughout the long process in developing this addendum. This is in violation of PASA 7.6.1 h.v. The BOD is included in the approval process of publishing standards and addenda for important reasons. Those reasons are varied and may not always be succinct but will consider what is best for this Society. The fact that there is now a compromise addendum going through the approval process thanks to the efforts of the Standards Committee since the Orlando meetings is proof that such a compromise has been possible and should have been given a chance previously. Having said all that, I should say that I find the science behind the addendum to be solid and commendable. I am not among those designers who approves of this type of product. However, I feel the PC did not follow the spirit of the rule requiring serious considerations of objections.
Bill McQuade abstained because of his association with AHRI.

Bill McQuade

William McQuade
Technology Council Chair

ABSTRACT

While indoor smoking has become less common in recent years, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts. ASHRAE's role in providing engineering technology, standards and design guidance in support of healthful and comfortable indoor environments supports the need for this position document.

ASHRAE's position is that all smoking activity inside and near buildings should be eliminated, which is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects. ASHRAE recommends that building design practitioners educate and inform their clients, where smoking is still permitted, of the limits of engineering controls of ETS exposure, that multifamily buildings have smoking bans inside and near them, and that further research be conducted on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs and electronic nicotine delivery devices (ENDS), and engaging in other activities commonly referred to as e-cigarettes or vaping.

EXECUTIVE SUMMARY

While indoor smoking has become less common in recent years, exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts. While ASHRAE does not conduct research on the health effects of indoor contaminants, ASHRAE has been involved in this topic for many years. Through its committees, standards, handbooks, guides, and conferences, ASHRAE has long been providing information to support healthful and comfortable indoor environments, including efforts to reduce indoor ETS exposure.

- ASHRAE is committed to encouraging lawmakers, policymakers and others who exercise control over buildings to eliminate smoking inside and near buildings.
- ASHRAE's current policy is that Standards and Guidelines shall not prescribe ventilation rates or claim to provide acceptable indoor air quality in smoking spaces. This PD recommends extending such policy to other ASHRAE documents.
- ASHRAE holds the position that the only means of avoiding health effects and eliminating indoor ETS exposure is to ban all smoking activity inside and near buildings. This position is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects and therefore,
    - The building and its systems can reduce only odor and discomfort but cannot eliminate exposure when smoking is allowed inside or near a building.
    - Even when all practical means of separation and isolation of smoking areas are employed, adverse health effects from exposure in non-smoking spaces in the same building cannot be eliminated.
    - Neither dilution ventilation, air distribution (e.g., "air curtains") nor air cleaning should be relied upon to control ETS exposure.
- ASHRAE recommends that building design practitioners work with their clients to define their intent, where smoking is still permitted, for addressing ETS exposure in their building and educate and inform their clients of the limits of engineering controls in regard to ETS.
- ASHRAE recommends that multifamily buildings have complete smoking bans inside and near them in order to protect nonsmoking adults and children.
- ASHRAE recommends, given current and developing trends, that further research be conducted by cognizant health authorities on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs, using ENDS, and engaging in other activities commonly referred to as vaping or using e-cigarettes.

1. THE ISSUE

While indoor smoking has become less common in recent years in many countries[1], exposure to Environmental Tobacco Smoke (ETS) continues to have significant health and cost impacts[38]. Researchers have investigated the health and irritant effects among non-smokers exposed to tobacco smoke in indoor environments. Such exposure is also known as passive smoking and as involuntary exposure to secondhand smoke. A number of national and global health research groups and agencies[1,2,9,13,16,20,23,28,29,34,37,38] have concluded, based on the preponderance of evidence, that exposure of nonsmokers to tobacco smoke causes specific diseases and other adverse effects to human health most significantly, cardiovascular disease and lung cancer. No cognizant authorities have identified an acceptable level of ETS exposure to non-smokers, nor is there any expectation that further research will identify such a level.

Despite extensive evidence of such harm, the well-documented benefits of bans, including exposure reduction and benefits to public health[36] and widening adoption of smoking bans, many locations worldwide still lack laws and policies that provide sufficient protection. In many locations, laws and policies are only partially protective, permitting smoking in certain building types including casino, entertainment and multifamily housing. Even where permitted by law, many developers, building owners, and operators, including those of restaurants and other hospitality venues, do not allow smoking indoors.

There are currently trends that increase use of electronic nicotine delivery systems (ENDS), smoking of cannabis, use of hookahs and other related activities that are beyond the scope of this document, but which likely present risks from involuntary exposure in the indoor environment that are not as well understood.

2. BACKGROUND

ASHRAE, through its Environmental Health Committee, TC 4.3 Ventilation Requirements and Infiltration, SSPCs 62.1 Ventilation for Acceptable Indoor Air Quality, 62.2 Ventilation and Acceptable Indoor Air Quality in Residential Buildings, 189.1 Standard for the Design of High-Performance Green Buildings, Handbook-Applications Chapter 46 and Handbook-Fundamentals Chapters 10 and 11, Indoor Air Quality Design Guides, and IAQ conferences, has long been active in providing engineering technology, standards and design guidance in support of providing healthful and comfortable indoor environments.

Previous versions of this position document have been instrumental in informing the public, building scientists and practitioners, policymakers and lawmakers about the inability of HVAC technologies to eliminate health risks to nonsmokers from exposure to tobacco smoke in indoor environments.

The evidence on the health consequences of exposure to ETS is extensive (hundreds of scientific papers) and has been reviewed by numerous independent expert groups in the United States and internationally, all reaching similar conclusions regarding the adverse health effects caused among nonsmokers exposed to tobacco smoke indoors. These include but are not limited to:

U.S. Surgeon General[9,38]
U.S. Environmental Protection Agency[16]
National Research Council[13]
California Environmental Protection Agency[20]
National Toxicology Program[23]
World Health Organization[1,2,28]
International Agency for Research on Cancer (IARC)[29]
United Kingdom Department of Health[34]

The first major studies on passive smoking reported that passive smoking was a cause of lung cancer in non-smokers. Subsequent evidence has identified other health effects in adults and children. Notably, the number of coronary heart disease deaths caused by ETS greatly exceeds the number of ETS-caused lung cancer deaths. Additionally, the scientific evidence recognizes substantial subpopulations, such as children[28,38] and adults with asthma or heart disease, whose disease may be exacerbated by ETS exposure.

There is no threshold for ETS exposure below which adverse health effects are not expected, as indicated in the referenced health authority reports. In general, risks tend to increase with the level of exposure and conversely to decrease with a reduction in exposure.

Only an indoor smoking ban, leading to near zero exposure, provides effective control, and only such bans have been recognized as effective by health authorities. Experience with such bans documents that they can be effective [2,9,36,38]. While there are no engineering design issues related to this approach, the existence of outdoor smoking areas near the building and their potential impacts on entryway exposure and outdoor air intake need to be considered.

Nevertheless, smoking is permitted in some indoor spaces in some buildings. There are now several decades of international experience with the use of strategies, including separation of smokers and nonsmokers, ventilation, air cleaning and filtration, to limit contamination spread from smoking permitted areas to other areas inside the building.

There are three general cases of space-use and smoking activity in sequence from most to least effective in controlling ETS exposure:
1) allowing smoking only in isolated rooms;
2) allowing smoking in separate but not isolated spaces; and
3) totally mixing occupancy of smokers and nonsmokers.

These approaches do not necessarily account for all circumstances. Each leads to different engineering approaches as follows.

1. Smoking Only in Isolated Rooms: Allowing smoking only in separate and isolated rooms, typically dedicated to smoking, can reduce ETS exposure in non-smoking spaces in the same building. Effective isolation requires

a) sealing of cross contamination pathways and airtightness of the physical barriers between the smoking and nonsmoking areas,
b) the use of separate ventilation systems serving the smoking and non-smoking spaces,
c) exhausting air containing ETS so it does not enter the non-smoking area through the outdoor air intakes, windows, and other airflow paths,
d) airflow and pressure control including location of supply outlets and return and exhaust air inlets to preserve airflow into the smoking space at doorways and other openings, which is powerful enough so that movement of people between non-smoking and smoking areas and so that thermal and other effects do not disrupt intended air distribution patterns.

Even when all available strategies have been employed in multifamily housing, there is a lack of credible evidence that anything short of a smoking ban will provide full protection to occupants of non-smoking residential dwelling units. The risk of adverse health effects for the occupants of the smoking room itself also cannot be controlled by ventilation.

2. Smoking in Separate but Not Isolated Spaces: This approach includes spaces where smokers and non-smokers are separated but still occupy a single space or a collection of smoking and non-smoking spaces not employing all the isolation techniques described in 2. a) through f) above. Examples can be found in restaurants and bars with smoking and non-smoking areas, or buildings where smoking is restricted to specific rooms, but a common, recirculating air handler serves both the smoking and non-smoking rooms.

Engineering techniques to reduce odor and irritation include, directional airflow patterns achieved through selective location of supply and exhaust vents, and air cleaning and filtration. Limited evidence is available, and none supports the significant reduction of health effects on those exposed.

3. Mixed Occupancy of Smokers and Nonsmokers: If smoking is allowed throughout a space or a collection of spaces served by a single air handler, with no effort to isolate or separate the smokers and nonsmokers, there is no currently available or reasonably anticipated ventilation or air cleaning

system that can adequately control or significantly reduce the health risks of ETS to an acceptable level.

This situation includes unrestricted smoking in homes, dormitories, casinos, bingo parlors, small workplaces, and open plan office spaces. Air cleaning, dilution ventilation and displacement ventilation can provide some reduction in exposure, but they cannot adequately control adverse health effects, nor odor and sensory irritation for nonsmokers in general.

Ongoing trends, studies and research:

- Electronic nicotine delivery systems (ENDS) are increasing in use and the health effects of primary and secondary exposure continue to be revealed. ENDS and other related exposures in the indoor environment, including those arising from cannabis combustion and use of hookahs, are outside the scope of this position document. ENDS are addressed in an ASHRAE Emerging Issue Brief.
- Third-hand smoke, which results from the release of contaminants from the clothing of smokers and other surfaces, is a relatively new concept. There is evidence of potential hazards[39] and researchers are still studying it[40].

3. RECOMMENDATIONS

- ASHRAE is committed to encouraging lawmakers, policymakers and others who exercise control over buildings to eliminate smoking inside and near buildings.
- ASHRAE's current policy (ROB 1.201.008) is that Standards and Guidelines shall not prescribe ventilation rates or claim to provide acceptable indoor air quality in smoking spaces. This PD recommends extending such policy to other ASHRAE documents.
- ASHRAE holds the position that the only means of avoiding health effects and eliminating indoor ETS exposure is to ban all smoking activity inside and near buildings. This position is supported by the conclusions of health authorities that any level of ETS exposure leads to adverse health effects and therefore,
    - The building and its systems can reduce only odor and discomfort but cannot eliminate exposure when smoking is allowed inside or near a building.
    - Even when all practical means of separation and isolation of smoking areas are employed, adverse health effects from exposure in non-smoking spaces in the same building cannot be eliminated.
    - Neither dilution ventilation, air distribution (e.g., "air curtains") or air cleaning should be relied upon to control ETS exposure.
- ASHRAE recommends that building design practitioners work with their clients to define their intent, where smoking is still permitted, for addressing ETS exposure in their building and educate and inform their clients of the limits of engineering controls in regard to ETS.
- ASHRAE recommends that multifamily buildings have complete and enforced smoking bans inside and near them in order to protect nonsmoking adults and children.
- ASHRAE recommends, given current and developing trends, that further research be conducted by cognizant health authorities on the health effects of involuntary exposure in the indoor environment from smoking cannabis, using hookahs, using ENDS, and engaging in other activities commonly referred to as vaping or using e-cigarettes.

REFERENCES

Note to Reviewers to be deleted in final version: The following shows the citations from the 2014-2017 PD versions that are retained and some new ones. In the final copy, the numeration needs to be compacted (eliminate numbers not used), and to meet ASHRAE Pub requirements, method of citation (author date), and formatting of each may need to be modified. This is all editorial and can happen after the vote(s).

1. World Health Organization. 2019. Report on the Global Tobacco Epidemic. Geneva, Switzerland WHO/NMH/PND/2019.5. https://www.who.int/tobacco/global_report/en/

9. U.S. Department of Health and Human Services. 2006. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General. Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. Atlanta, Ga. https://www.ncbi.nlm.nih.gov/books/NBK44324/

13. National Research Council (NRC), 1986. Committee on Passive Smoking. Environmental tobacco smoke: Measuring exposures and assessing health effects. National Academy Press Washington, D.C. https://www.ncbi.nlm.nih.gov/books/NBK219205/

16. US Environmental Protection Agency (EPA). 1992. Respiratory health effects of passive smoking: Lung cancer and other disorders. EPA/600/006F. U.S. Government Printing Office, Washington, D.C. https://www.epa.gov/indoor-air-quality-iaq/respiratory-health-effects-passive-smoking-lung-cancer-and-other-disorders

20. California Environmental Protection Agency (Cal EPA). 2005. Office of Environmental Health Hazard Assessment. Health Effects of Exposure to Environmental Tobacco Smoke. California Environmental Protection Agency. https://oehha.ca.gov/air/report/health-effects-exposure-environmental-tobacco-smoke-final-report

29. International Agency for Research on Cancer (IARC). 2004. Tobacco smoke and involuntary smoking. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No 83. International Agency for Research on Cancer. Lyon, France. https://www.ncbi.nlm.nih.gov/books/NBK316407/

34. Scientific Committee on Tobacco and Health and HSMO. 1998. Report of the Scientific Committee on Tobacco and Health. The Stationary Office. 1998; 011322124x https://www.gov.uk/government/publications/report-of-the-scientific-committee-on-tobacco-and-health

NEW REFERENCES

36. CPSTF (Community Preventive Services Task Force) 2013. Reducing Tobacco Use and Secondhand Smoke Exposure: Smoke-Free Policies. June 3, 2013. https://www.thecommunityguide.org/sites/default/files/assets/Tobacco-Smokefree-Policies.pdf

37. Institute of Medicine 2010. *Secondhand Smoke Exposure and Cardiovascular Effects: Making Sense of the Evidence*. Washington, DC: The National Academies Press. https://doi.org/10.17226/12649.

38. US Department of Health and Human Services (USDHHS). 2014 The health consequences of smoking – 50 years of progress: a report of the Surgeon General. – Atlanta, GA, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. https://www.ncbi.nlm.nih.gov/books/NBK179276/

39. Sleiman 2010. "Formation of carcinogens indoors by surface-mediated reactions of nicotine with nitrous acid, leading to potential *thirdhand smoke* hazards," *Proceedings of the National Academy of Sciences*, April 13, 2010 107 (15) 6576-6581. https://doi.org/10.1073/pnas.0912820107

40. Mayo Clinic 2017. "What is thirdhand smoke, and why is it a concern?" Answer from J Taylor Hays, M.D. July 13, 2017. www.mayoclinic.org/healthy-lifestyle/adult-health/expert-answers/third-hand-smoke/faq-20057791, accessed March 2, 2020.

Title: Environmental Tobacco Smoke (ETS)

Purpose: To inform ASHRAE membership and the public about the health effects of ~~involuntary~~ secondary exposure to ~~tobacco~~ smoke from the combustion of tobacco.

Scope:

- Define what is meant by ETS, passive smoke, and ~~involuntary~~ secondary exposure to smoking
- Describe the types of indoor environments where ETS exposure might occur.
- Reference health effects associated with ~~involuntary~~ secondary exposure to tobacco smoke.
- Report on worldwide efforts to reduce/restrict ~~involuntary~~ secondary exposure.
- Recommend that ASHRAE members follow the guidance available in local/state code and/or ASHRAE documents/standards.

ATTACHMENT C

ASHRAE Position Document on Indoor Air Quality

Approved by ASHRAE Board of Directors
Month Day, 20XX

Expires
Month Day, 20XX

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COMMITTEE ROSTER

The ASHRAE Position Document on Indoor Air Quality was developed by ASHRAE's Indoor Air Position Document Committee formed on January 26, 2018, with Donald Weekes Jr. as its chair.

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Hanson Professional Services
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HISTORY OF REVISION/REAFFIRMATION/WITHDRAWAL DATES

The following summarizes this document's revision, reaffirmation, or withdrawal dates:

1989 – BOD approves Position Document titled Indoor Air Quality

6/28/2001 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

2/10/2005 – BOD approves reaffirmation of Position Document titled Indoor Air Quality

7/21/2011 – BOD approves revision to Position Document titled Indoor Air Quality

7/2/2014 – Technology Council reaffirms Position Document titled Indoor Air Quality

6/28/2017 – Technology Council reaffirms Position Document titled Indoor Air Quality

X/XX/20XX – BOD approved revision to Position Document titled Indoor Air Quality

Note: ASHRAE's Technology Council and the cognizant committee recommend revision, reaffirmation, or withdrawal every 30 months.

Note: ASHRAE position documents are approved by the Board of Directors and express the views of the Society on a specific issue. The purpose of these documents is to provide objective, authoritative background information to persons interested in issues within ASHRAE's expertise, particularly in areas where such information will be helpful in drafting sound public policy. A related purpose is also to serve as an educational tool clarifying ASHRAE's position for its members and professionals, in general, advancing the arts and sciences of HVAC&R.

ABSTRACT

It is ASHRAE's position that provision of ~~good~~ acceptable IAQ is an essential building service and that all decisions about buildings and heating, ventilating, and air-conditioning (HVAC) systems must consider the implications for IAQ. This position holds for all building types, including sustainable and resilient buildings where measures have been taken to reduce environmental impacts and energy use.

ASHRAE recommends further research on the impact of IAQ on people's health, comfort, well-being, learning outcomes and work performance, and continued development of the technologies needed to address IAQ in all types of buildings.

ASHRAE is committed to maintain and update IAQ standards and guidelines and to use its leadership position to promote research, education, and best practices in IAQ.

The appendix of this document provides evidence to support these positions, including the effects of IAQ on human health, comfort, well-being, learning outcomes and work performance, and the economic benefits of improved IAQ.

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Commented [SH1]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in referenced literature.
All usages of the term were used and replaced throughout.

Commented [LL2]: Sleep performance not important?

Commented [SH3R2]: PDC left as is. Sleep is part of well-being which could bring in other aspects such as exercise, etc. not listed here.

Commented [SH4]: PDC felt 'work' should be kept. "Work performance".
These are terms used in literature of evidence used to make these recommendations

Commented [SH5]: See earlier comment on 'learning outcomes'

Commented [SH6]: See earlier comment on work and work performance

EXECUTIVE SUMMARY

Indoor air quality (IAQ) has long been a critical issue for ASHRAE and its members because of the connection to ventilation and other HVAC systems in buildings. ASHRAE's Standards 62.1 (commercial and institutional buildings) and 62.2 (residential buildings) intended to support acceptable IAQ have been the benchmarks for ASHRAE's members and others involved with IAQ (e.g., practitioners; contractors; industrial hygienists) since 1973. ASHRAE has been concerned with all aspects of IAQ through its Position Documents, other standards and guidelines, conferences, and other efforts.

ASHRAE's positions are that:

- IAQ impacts people's health, comfort, well-being, learning outcomes and work performance. Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
- The provision of acceptable IAQ is an essential building service and central to ASHRAE's purpose.
- Achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including efforts to improve building energy efficiency, sustainability and resiliency.
- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation should be included in educational programs.
- ASHRAE's IAQ standards should be adopted by building codes and regulations.

Commented [BWP7]: Should Std. 170 be mentioned? It is in the body of the PD.

Commented [SH8R7]: PDC decided not to include here. Concern is not less on special environments here in exec summary.

Commented [MHS9]: Does ASHRAE have 2nd class positions? All the positions should be listed here.

Commented [SH10R9]: These are copied from positions listed later in PD to comply with ASHRAE PD template.

Please refer to review comments below for discussion on changes

Commented [SH11]: See earlier comment on 'learning outcomes'

1. THE ISSUE

Indoor air is ~~a~~ the dominant pathway for exposure to airborne contaminants given that people spend the majority of their time indoors, and indoor air commonly contains numerous contaminants originating from both indoor and outdoor sources. Many of the contaminants impact health, comfort, well-being, learning outcomes and work performance. It is important that IAQ is considered in the design, construction and operation of buildings and HVAC systems. ASHRAE and its partners have long pursued improved IAQ through a range of activities.

2. BACKGROUND

This document contains a high level discussion of indoor air quality given that ASHRAE has published many informative documents related to indoor air quality such as the Handbook - ~~Previous versions of this position document went into great technical detail on a broad range of IAQ issues. These details are not included in this document because that information is now well covered in other ASHRAE publications such as the Handbook –~~ Fundamentals (particularly Chapters 9 through 12) and two IAQ guides: "Indoor Air Quality Guide – Best Practices for Design, Construction and Commissioning" and "Residential Indoor Air Quality Guide: Best Practices for acquisition, design, construction, maintenance and operation".

Additionally, many other important IAQ issues are not covered here, as there are separate Position Documents that cover specific topics including: ~~Airborne~~ Infectious Aerosols~~Diseases~~,, Environmental Tobacco Smoke, Unvented Combustion Devices and IAQ, Filtration and Air Cleaning, and Limiting Indoor Mold and Dampness in Buildings. Instead, this document focuses on recommendations in several broad areas including policy, research, and education related to IAQ.

2.1 Overview

An established and still growing body of literature, summarized in the Appendix of this document, has demonstrated that: (1) IAQ impacts occupant health, comfort, well-being and the ability to work and learn, and therefore, (2) improving IAQ will bring benefits at the societal and individual levels.

Indoor air quality (IAQ) refers to the types and concentrations of airborne contaminants found in buildings. And while there is no universally accepted definition of "good" IAQ, there are three widely accepted approaches to improving IAQ in buildings:

- **Source control**
  - Use building materials, furnishings, appliances, and consumer products with low contaminant emissions;
  - Minimize indoor contaminant sources caused by occupant activities;
  - Remove outdoor contaminants via filtration and air cleaning before they enter a building; and

Commented [MHS12]: Only one thing can dominate

Commented [SH13R12]: PDC made change suggested by MS

Commented [EJS14]: ASHRAE 62.1 has steered away from the use of "contaminants" when referring to sources. Not all emissions from indoor or outdoor air are harmful or unnatural. "Contaminant" denotes a substance that would not ordinarily be present or that is somehow harmful.

Commented [SH15R14]: PDC noted they've discussed before and confirmed to go with contaminants. This is OK and PD committee did not like any other terms better here

Commented [SH16]: See earlier comment on 'learning outcomes'

Commented [SH17]: PDC felt 'work' should be kept. "Work performance".
These are terms used in literature of evidence used to make these recommendations

Commented [BWP18]: I don't think this explanation is needed, but the reference to sources of more detailed information is fine.

Commented [HS19R18]: PDC agreed to changes as shown

Commented [EJS20]: change

Commented [SH21R20]: PDC made change.

Commented [HE22]: "Infectious Aerosols"

Commented [SH23R22]: PDC made change.

Commented [LL24]: Maybe "Elements"? Child grow up with more germs can have stronger immune system; Diversity of microbe maybe important for healthier air (see below). Do we know enough to narrow study those elements as only "contaminants"?
https://www.ncbi.nlm.nih.gov/books/NBK458819/

Commented [SH25R24]: PDC – Felt contaminants was best choice of word here.

Commented [HE26]: Unclear – "Remove contaminants from outdoor air being brought into the building"

Commented [SH27R26]: PDC agreed to change as shown.

  - Design, operate, and maintain building enclosures, HVAC systems, and plumbing systems to reduce the likelihood of moisture problems and/or quickly mitigate them when they happen.
- **Ventilation**
  - Ensure that clean ~~outdoor~~ air is delivered to occupied spaces in order to effectively dilute and remove contaminants emitted by indoor sources and that air is exhausted in the vicinity of localized indoor sources.
- **Air cleaning**
  - Use effective air cleaning technologies to remove contaminants from outdoor ventilation air and recirculated indoor air.

Cost-benefit analyses have estimated that the health and economic benefits of improved IAQ are far greater than the costs of implementing these improvements. Also, many strategies exist, and others continue to emerge, that can help achieve good IAQ with lower energy impacts. Ultimately, an integrated design approach that considers both IAQ and energy, in addition to other key aspects of building performance such as site impacts, water use and other environmental impacts, is required to achieve high performing buildings that are energy efficient and achieve good IAQ. For more information on integrated design in context of IAQ see the ASHRAE IAQ Design Guide.

Commented [MHS28]: The ASHRAE definition of ventilation does not require the air be outdoor—whatever that means. It requires that it be clean and suitable for dilution of indoor contaminants.

Commented [SH29R28]: PDC agreed and deleted outdoor

2.2 ASHRAE Activities in Support of IAQ

ASHRAE ~~promotes good~~ better ~~IAQ by providing~~provides technical resources, ~~coordinating~~ coordinates and ~~funding~~ funds research, ~~organizing~~ organizes conferences, and ~~educating~~ educates practitioners about IAQ. ASHRAE has also developed and continues to support standards, guidelines, and other resources related to improving IAQ. For example, ASHRAE promulgates the following ~~minimum~~ standards that specifically address IAQ:

- ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quali*ty. This Standard, first published in 1973, establishes minimum ventilation and other IAQ related requirements for buildings other than residential and health care. Its outdoor air ventilation rate requirements have been adopted into the International Mechanical Code and Uniform Mechanical Code, the two most common model building codes in the US. The standard is also referenced by most green building programs including LEED.
- ANSI/ASHRAE Standard 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. This Standard, first published in 2003, covers residential buildings. Minimum ~~V~~ventilation requirements from this standard have been adopted into codes, including California's Title 24, and into LEED for Homes and the U.S. Environmental Protection Agency's (EPA) Indoor airPlus program.
- ANSI/ASHRAE/ASHE Standard 170, *Ventilation of Health Care Facilities*. Standard 170 brought together several documents used throughout North America into a single standard. It is now widely used in building codes for ventilation requirements in hospitals and other health care facilities.
- ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1, *Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings*. Developed in conjunction with USBGC, the International Code Council and Illuminating

Commented [MHS30]: Not all these standards are for good IAQ. The 62s in particular targeted on **acceptable** IAQ not **good** IAQ as the lead to this paragraph implies.

Commented [SH31R30]: PDC – agreed to changes to 1st sentence as shown

Commented [MHS32]: It is important to note that these standards are minimum standards.

Commented [SH33R32]: PDC removed 'minimum' here and added to 62.1 & 62.2 below.

Engineering Society (IES), this standard provides IAQ requirements beyond those in Standard 62.1. The standard was developed to be adopted as part of voluntary green/sustainable rating systems, green building incentive programs, and local building regulations. The most recent version of the standard (2017) serves as the technical content of the 2018 International Green Construction Code.

In addition, ASHRAE has published a number of guidelines and design guides help practitioners achieve good IAQ in buildings, including:

- ~~ASHRAE Guideline 24, *Ventilation and Indoor Air Quality in Low-Rise Residential Buildings.* This Guideline is a companion document to standard 62.2 that expands beyond the standard's minimum requirements to discuss best practices and system design.~~
- ASHRAE *Indoor Air Quality Guide – Best Practices for Design, Construction, and Commissioning*. This Guide, resulting from a collaborative effort of six leading organizations in the building community, presents best practices for design, construction, and commissioning that have proven successful in other building projects. It provides information and tools that architects and design engineers can use to achieve an IAQ-sensitive building that integrates IAQ into the design and construction process along with other design goals, budget constraints, and functional requirements.
- ASHRAE *Residential Indoor Air Quality Guide: Best Practices for Acquisition, Design, Construction, Maintenance and Operation*" addresses IAQ issues in residential buildings.
- ~~The ASHRAE Epidemic Task Force has recently published guidance initiated by the COVID19 pandemic, which can be found at http://www.ashrae.org/covid19~~

A more complete list of standards, guidelines, and other relevant ASHRAE publications is included in the Appendix of this document.

3. RECOMMENDATIONS

- ASHRAE holds the following positions: ~~(PDC suggested keeping as listed, not all bullets in exec summary)~~
  - ~~Good~~ IAQ ~~is essential for~~impacts people's health, comfort, well-being, learning outcomes ~~ability~~ and work performance. ~~It~~ Improved IAQ brings substantial health and economic benefits from a broad public health perspective, as well as to individual building owners and occupants.
  - The provision of acceptable ~~good~~ IAQ is ~~thereby~~ an essential building service and central to ASHRAE's purpose.
  - Achieving and maintaining good IAQ should be included in all decisions that affect the design and operation of buildings and HVAC systems, including

Commented [SH34]: PDC had question on if this was withdrawn.

From Mark Weber: 'SRS approved the withdrawal public review. Has to get approved by StdsC on June 26th first."

Still in bookstore and not on website list of withdrawn standards.

Commented [MHS35]: While the PDC did not consult this in the development of the PD, it should be included here. As it is a good and timely resource

Commented [SH36R35]: PDC agreed but will listed in the Appendix as it is a bit difference in nature than the other references listed here.

Commented [BWP37]: This appears to be a note that should be deleted.

Commented [SH38R37]: PDC – yes. Deleted.

Commented [EJS39]: Is the PDC expectation that this more detailed expansion of the two summary bullets be deleted? Perhaps this could be reordered so that each of these bullets fall under one or the other of the two in the Executive Summary.

Commented [SH40R39]: PDC – this was mistakenly left it. Deleted now. Intent is now to list positions here and co ...

Commented [MHS41]: This is a key problem. It cannot be ASHRAE's position that Good IAQ is essential. ...

Commented [SH42R41]: PDC - Delete 'good' change to 'IAQ impacts'.. ...

Commented [SH43]: See earlier comment on 'learning outcomes'

Commented [HS44]: BOD member Andres Sepulveda

Commented [SH45R44]: PDC refers to 'learning outcomes' vs. 'learning' as this term is commonly used in ...

Commented [SH46]: PDC felt 'work' should be kept . "Work performance". ...

Commented [HS47]: Sepulveda comment Suggested "productivity" vs. work performance

Commented [SH48R47]: PDC – prefers work performance as a common term in much of referenced ...

Commented [SH49]: PDC agreed to replace 'good' with 'acceptable'

Commented [MHS50]: This sentence is a key and separate thought; it surely deserves its own bullet. ...

Commented [SH51R50]: PDC - deleted

Commented [LL52]: Max's comment?

Commented [SH53R52]: PDC – OK here

efforts to improve building energy efficiency, sustainability and resiliency.

- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation ~~shall~~ should be included in educational programs.
- ASHRAE's IAQ standards should be adopted by ~~national and local~~ building codes and regulations.

- ASHRAE recommends fundamental and applied IAQ research and standards development in the following areas:
  - The relationship of ventilation rates and contaminant concentrations to occupant health, comfort, well-being, learning outcomes and work performance.
  - Approaches to improving IAQ beyond dilution ventilation, e.g., air cleaning and ~~contaminant's~~ source control.
  - Development of tools to allow economic valuation of IAQ benefits for individual buildings and groups of buildings.
  - Development of monitoring and HVAC equipment to control IAQ by measurement of contaminant's ~~.concentration.~~
  - Development of diagnostics ~~diagnostic tools~~ for commissioning and maintenance of ventilation and related IAQ systems.
  - The role of IAQ in building sustainability and resilience.
  - Development of IAQ control systems and solutions that contribute to other building goals including reducing energy use and greenhouse gas emissions and supporting grid integration.
  - Research on new contaminants of concern and development of technologies and approaches to address them.

- ASHRAE is committed to:
  - Maintaining and updating IAQ standards, guidelines and handbooks;
  - Integrating principles of IAQ within its professional education programs
  - ~~Development~~ Advancement of IAQ research including tools and applications;
  - Using its leadership position to develop partnerships with international organizations to promote research, education, and best practices in IAQ.

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4. REFERENCES

(editors to list references cited in PD here)

A. APPENDIX

This appendix summarizes the relevant literature supporting ASHRAE's IAQ Position Document and provides additional context for the positions and recommendations contained in that document.

A.1 What is indoor air quality?

For the purposes of this document, indoor air quality (IAQ) refers to the types and concentrations of contaminants in indoor air that are known or suspected to affect people's comfort, well-being, health, learning outcomes and work performance. Primary classes of these contaminants include particulate matter (both biological, including allergens, potential pathogens, and non-biological), organic gases (e.g., volatile and semi-volatile organic compounds), and inorganic gases (e.g., carbon monoxide, ozone, and nitrogen oxides). Other factors contributing to IAQ include water vapor and odors. Indoor concentrations of contaminants are influenced by outdoor concentrations, ventilation and infiltration, indoor emissions, and a number of other contaminant-specific source and sink mechanisms (e.g., deposition, chemical reactions, and air cleaning).

IAQ impacts humans by exposure to pollutants by inhalation, dermal and ingestion pathways. Personal and indoor exposures to many airborne contaminants are commonly higher than outdoor exposures (e.g., Meng et al., 2009; Morawska et al., 2013; Sexton et al., 2004; Wallace, 2000; Wallace et al., 1991, 1985), and the majority of human exposure to outdoor contaminants also typically occurs indoors (e.g., Asikainen et al., 2016; Azimi and Stephens, 2018; Chen et al., 2012, 2012; Logue et al., 2012; Weschler, 2006). These elevated exposures arise because of the large amount of time that people spend indoors (Klepeis et al., 2001) and because concentrations of many contaminants are higher indoors than outdoors (e.g., Abt et al., 2000; Adgate et al., 2004; Meng et al., 2005; Rodes et al., 2010; Wallace et al., 1991; Zhang et al., 1994).

While this appendix does not address hygrothermal conditions, the recommendations in the position document recognize the effects of temperature and moisture levels on IAQ through changes in contaminant emission rates, the growth of microorganisms on building surfaces, the survival of infectious pathogens in air and on surfaces, the survival of house dust mites (a source of allergens), people's perception of the quality of indoor air, and ultimately, the effects of moisture and moisture associated problems (e.g. mold, fungi or house dust mite) on the prevalence of building related symptoms.

A.2 How does IAQ impact health, comfort, well-being, learning outcomes and ~~work~~ performance?

IAQ impacts occupant health, comfort, well-being, learning outcomes and ~~work~~ performance (Jones, 1999; Spengler and Sexton, 1983; Sundell, 2004). There is a small but growing body of epidemiology literature that has specifically linked indoor

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All usages of the term were used and replaced throughout.

contaminant exposures or sources to various adverse health outcomes, including but not limited to: combustion appliances (e.g., gas stoves) and respiratory illness in children (e.g., Garrett et al., 1998; Kile et al., 2014; Lanphear et al., 2001; Melia et al., 1977); VOCs and childhood asthma (e.g., Rumchev, 2004); chemical household products and respiratory symptoms in children (e.g., Sherriff, 2005) and asthma in adults (e.g., Zock et al., 2007); phthalates and asthma and allergy symptoms in children (e.g., Bornehag et al., 2004; Jaakkola and Knight, 2008; Kolarik et al., 2008); pet allergens and childhood asthma (e.g., Lanphear et al., 2001); radon exposure and lung cancer (Samet, 1989); airborne-transmitted infectious diseases such as pulmonary tuberculosis (TB) (Burrell, 1991), severe acute respiratory syndrome (SARS) (Li et al., 2007), COVID-19 (ASHRAE, 2020) and the common cold (Myatt et al., 2004); and carbon monoxide (CO) poisoning (Ernst and Zibrak, 1998); among others.

Some attempts have been made to quantify the burden of health effects associated with chronic (i.e., long-term) exposure to contaminants in indoor air. For example, Logue et al. (2011) and Logue et al. (2012) estimated the health impacts of long-term exposure to contaminants commonly found in U.S. homes using Disability Adjusted Life Years (DALYs) to establish a hierarchy of contaminants of concern. Similarly, Asikainen et al. (2016) estimated the annual disease burden caused by exposure to air pollutants in residential buildings in the European Union to be approximately 2.1 million DALYs per year, driven primarily by exposure to fine particulate matter (diameter ≤ 2.5 μm; $PM_{2.5}$) originating from outdoor sources, followed by $PM_{2.5}$ from indoor sources.

Additionally, excessive dampness or moisture in buildings is associated with a range of problems including mold, dust mites and bacteria; and exposure to damp environments is associated with respiratory problems including asthma (e.g., Heseltine et al., 2009; IOM, 2004; Kanchongkittiphon et al., 2014; Mendell et al., 2011). Indoor contaminants can act as respiratory irritants, toxicants, and adjuvants or carriers of allergens (Bernstein et al., 2008) and can adversely affect human productivity (Wargocki et al., 1999) and cause odor problems. Recent evidence has also suggested that pollutants in indoor air may reduce cognitive function (Allen et al., 2016; Satish et al., 2012).

One of the most common health complaints is the occurrence of building-related symptoms including eye, nose, and throat irritation, difficulty in concentrating and thinking clearly, headaches, fatigue and lethargy, upper respiratory symptoms, and skin irritation and rashes, as well as overall poor well-being (e.g., Bluyssen et al., 1996; Mendell, 1993; Mendell and Smith, 1990; World Health Organization, 1983). The term "sick building syndrome" ("SBS") has been used to describe the excess prevalence of these symptoms, without attribution to specific pathogens or illnesses or building characteristics, and is viewed as more informative than building-related symptoms (Redlich et al., 1997). The term "building-related illness" refers to diseases including hypersensitivity pneumonitis and Legionnaires' disease, which are associated with specific exposures to pathogens and other contaminants in a building (Bardana et al., 1988).

A.3 What are effective ways to improve IAQ?

The foremost approach to improving IAQ is source control both indoors and outdoors (Carrer et al., 2018; Nazaroff, 2013). Reducing or minimizing indoor contaminant sources can be achieved through selection of construction materials, furnishings, and maintenance products with low emission rates, restricting occupant use of fragranced or scented products (Steinemann et al., 2011), and minimizing the emissions from human activities for example by installing "walk-off" mats (Farfel et al., 2001; Layton and Beamer, 2009). Another form of source control is local exhaust ventilation, which removes contaminants before they have the opportunity to mix within occupied spaces, such as for residential cooker/range hoods (Delp and Singer, 2012; Lunden et al., 2015), and wet spaces, e.g., bathrooms and laundry rooms.

One element of source control is to keep buildings dry, for example by minimizing indoor sources of water vapor through source control and the control of moisture using humidifiers and dehumidifiers, as well as by designing and constructing building enclosures and HVAC systems to limit moisture problems (ASHRAE, 2018a, 2009; Heseltine et al., 2009). Episodic water events that invariably happen (e.g., floods, leaks, etc.) must be managed rapidly and effectively to prevent water damage and sustained dampness.

After effective source control, ventilation is used to dilute indoor contaminants with clean outdoor air. Literature reviews show that increasing ventilation rates led to improved health outcomes (e.g., Carrer et al., 2015; Sundell et al., 2011). Using ventilation to improve IAQ should also include minimizing the entry of contaminants from outdoors in polluted ambient environments (e.g., Liu and Nazaroff, 2001; Singer et al., 2016; Stephens et al., 2012; Stephens and Siegel, 2012; Walker and Sherman, 2013), (for example by reducing enclosure leakage or effectively filtering the outdoor air supply).

The third strategy, after source control and ventilation, is to clean indoor air via particle filtration and gaseous air cleaning. The ASHRAE Position Document on Filtration and Air Cleaning (ASHRAE, 2018b) and the U.S. Environmental Protection Agency's Guide to Air Cleaners in the Home (US EPA, 2018) both address many important issues related to filtration and air cleaning, as do recent literature reviews (e.g., Fisk, 2013; Zhang et al., 2011). For example, particle filters have been shown to reduce indoor concentrations of airborne particles and some empirical evidence shows that their use can have positive impacts on health. Some sorbent air cleaners have been shown to effectively reduce concentrations of gaseous contaminants, albeit with minimal empirical data on their impacts on health.

The complex relationship between IAQ and external environmental conditions, coupled with the effects of climate change, necessitates a shift towards designing and operating buildings that are not only comfortable and healthy for the occupants but are also sustainable. It is generally believed that achieving good IAQ can only result with increased energy consumption. However, many strategies exist that can both secure high IAQ and reduce energy use, including increased envelope airtightness, heat

recovery ventilation, demand controlled ventilation, and improved system maintenance (Persily and Emmerich, 2012). Additionally, more dynamic ventilation strategies are being developed that allow time shifting and other variable ventilation strategies such as smart ventilation (e.g., Rackes and Waring, 2014; Sherman et al., 2012; Sherman and Walker, 2011).

A.4 What are the economic costs and benefits of improving IAQ?

Socio-economic costs of air pollution can be substantial (Asikainen et al., 2016; Boulanger et al., 2017; Jantunen et al., 2011). Providing improved IAQ is estimated to have substantial economic benefits (e.g., Aldred et al., 2016a, 2016b; Bekö et al., 2008; Brown et al., 2014; Chan et al., 2016; Fisk et al., 2012, 2011; Fisk and Chan, 2017; MacIntosh et al., 2010; Montgomery et al., 2015; Rackes et al., 2018; Zhao et al., 2015). The economic benefits accrue from having higher worker productivity (e.g., Allen et al., 2016; Wargocki and Wyon, 2017), improved learning (e.g., Haverinen-Shaughnessy et al., 2011; Wargocki and Wyon, 2013), lower absentee rates (e.g., Milton et al., 2000), and reduced healthcare costs. In workplaces, measures that result in only small improvements in performance or absence will often be cost effective because, in developed countries, employee costs (e.g. salaries, health benefits) far exceed the costs of maintaining good IAQ (Wargocki et al., 2006; Woods, 1989). Additional economic benefits are possible through reduced maintenance costs and avoidance of IAQ investigations and remediation measures by designing, constructing, and operating buildings in a manner that reduces the likelihood of serious IAQ problems, such as widespread dampness and mold.

Several studies that have estimated the costs and benefits of improved source control, ventilation, and air-cleaning technologies are summarized below:

Source Control: Wargocki and Djukanovic (2005) estimated the costs associated with improving IAQ by reducing the load of pollution sources in a hypothetical building. The additional investments in energy, HVAC first costs and maintenance costs, and building construction costs were highly cost effective, with payback times below ~~2~~ two years and an estimated return on investment that was ~~4~~four to ~~7~~ seven times higher than the assumed interest rate of 3.2%. However, no specific analysis was conducted to estimate how much of these effects can be attributed to source control and how much to increased ventilation rates. Asikainen et al. (2016) estimated that a 25% reduction in indoor $PM_{2.5}$ sources, a 50% reduction in indoor VOCs and dampness, and a 90% reduction in radon, carbon monoxide, and second hand smoke in residential buildings in the European Union could reduce the burden of disease associated with residential indoor air exposures by approximately 44%.

Ventilation: Fisk et al. (2011) estimated that the combined potential annual economic benefit of implementing a combination of IEQ improvements in U.S. offices (including increasing ventilation rates, adding outdoor air economizers, eliminating high indoor temperatures during winter, and reducing dampness and mold problems) is

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approximately $20 billion per year. Similarly, Fisk et al. (2012) estimated that the economic benefits of increasing minimum ventilation rates in U.S. offices far exceed energy costs and that adding economizers would yield health, performance, and reduced absence benefits while saving energy. Dorgan et al. (1998) estimated the costs of improving ventilation in 40% of office buildings in the US considered unhealthy i.e. not meeting standard 62.1; the payback time of such activity was estimated to be below 1.4 years because of benefits for health and work performance resulting from it. Rackes et al. (2018) introduced an outcome-based ventilation framework for assessing performance, health, and energy impacts to inform ventilation rate decisions in U.S. office buildings and estimated that the economic benefits of increased ventilation rates in offices are routinely greater than additional energy costs or adverse health costs associated with introducing more outdoor contaminants through increased ventilation.

Filtration and air cleaning: Bekö et al. (2008) estimated that the health and productivity benefits of higher-performance filters would exceed their costs by well over a factor of 10 in an example office building. Montgomery et al. (2015) estimated benefit-to-cost ratios of up to 10 for improved filtration in office buildings in a variety of cities. Fisk and Chan (2017) similarly estimated benefit-to-cost ratios ranging from ~~3~~ three to 133 for the use of filters and/or portable air cleaners in both residences and commercial buildings. In all of the above studies, the avoided health care costs were the largest benefit of air cleaning. These and other studies on the costs and benefits of filtration and air cleaning were reviewed in Alavy and Siegel (2019).

Limited interview-based studies of decision-makers in the building industry in the U.S. have shown that they tend to underestimate the positive impacts of ventilation and filtration upgrades while overestimating costs (Hamilton et al., 2016). These findings suggest the need for educational activities to inform the industry on the costs and benefits of achieving good IAQ.

A.5 Summary

It is clear from the work cited in this appendix that IAQ in buildings is an essential building service that is vitally important to building occupants, owners, and designers, and therefore to ASHRAE. The health and economic impacts of IAQ are significant, and it is therefore essential to consider IAQ in all phases of building planning, design, and operation. Current design approaches and technologies include meeting minimum requirements (e.g., for ventilation as provided by ASHRAE Standards 62.1 and 62.2) and following guidelines for beyond-minimum performance (e.g., the ASHRAE IAQ design guides).

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ATTACHMENT D

Title
Indoor Air Quality

Purpose
The purpose of this position document is to inform the ASHRAE membership and the public of the importance of indoor air quality (IAQ)

Scope
1. Identify issues that affect the provision of high quality indoor air.
2. Summarize current state of knowledge including health, comfort, and productivity impacts of IAQ.
3. Discuss implementation of current knowledge through codes, standards and guidelines.
4. Recommend research needed.
5. Recommend needed education efforts and interaction with other relevant public and private organizations.

ATTACHMENT E

ANALYSIS SHEET

RECOMMENDATION TO BOARD OF DIRECTORS FOR APPROVAL TO PUBLISH PROPOSED STANDARD/GUIDELINE/ADDENDUM

1. Designation:	BSR/ASHRAE Addendum *a* to ANSI/ASHRAE Standard 62.2-2016, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*
2. Chair:	Paul Francisco
3. Cognizant TC:	4.3, *Ventilation Requirements and Infiltration*
4. Public Review Dates:	2nd Public Review (FULL): 10/13/2017 to 11/12/2017 (30-days)
5. Comments Received:	2nd Public Review (FULL): 19 comments from 14 commenters
6. Unresolved Comments:	2nd Public Review (FULL): 16 comments from 11 commenters TOTAL: 16 comments from 11 commenters
7. PC Approval Vote:	19-7-0-4-0 (Yes-No-No without comment-Abstain-Ballot not returned)
8. Total # Unresolved Objectors to be Offered Right to Appeal:	Fifteen (15) - There are 11 unresolved commenters (Kerry Leason, Ken Belding, David Delaquila, Gregg Achman, Thomas Stroud, Don Denton, Bruce Swiecicki, Frank Stanonik, Martin Yan, Ron Smith, Ted Williams) and 7 negative project committee votes (David Delaquila, Armin Rudd, Gregg Gress, Darren Meyers, Thomas Stroud, Ted Williams, David Noyes) on the final vote for publication with unresolved objectors. There were also 5 negative project committee votes (Darren Meyers, David Delaquila, Armin Rudd, Thomas Stroud, Ted Williams) on the vote for the 2nd full PPR.
9. StdC Vote for Approval:	19-2[1]-1[2], CNV (Yes-No-Abstain)
10. Description:	Standard 62.2 first included unvented space heaters within its scope in the 2013 edition. This addendum represents the first requirements related to these devices. It prohibits unvented space heaters from being used in 62.2-compliant dwellings unless they were listed to ANSI Standard Z21.11.2, 2002 or later. For appliances that do meet an eligible ANSI standard, it limits the heating capacity of heaters based on volume of the space in which they are located, with the goal

[1] Susanna Hanson voted no stating, "My reason for no vote on 62.2-a from Saturday at Standards has not changed from the last time we were asked to vote on this addendum. While I believe that more documentation of emails was done this time around, I still believe there was a lack of good faith effort to resolve comments. The 2nd public review prior to the successful appeal simply removed the requirement for additional ventilation when non-vented gas appliances were used, and straight-out outlawed instead. Since the committee knew there was no common ground, and the expected outcome was to overrule unresolved objections, I question why the committee did not leave the additional ventilation option and vote that version out with knowledge of unresolved objections. The commenters' not requesting to have the table added back is not evidence that they were intransigent, rather that they did not want to be forced to endorse the approach that they originally objected to. Leave the offending procedure from the first public review, if it were technically defensible, and then vote to publish with knowledge of unresolved objections. I also object to Standards committee not allowing time enough time to discuss prior to the vote." Mike Woodford voted no stating, "Unresolved comments not adequately addressed in accordance with appeals decision."

[2] Larry Schoen abstained because he is a member of the SSPC.

of guaranteeing that nitrogen dioxide levels would not exceed current EPA standards.

11. Summary of Unresolved Comments and Negative PC Votes:

Fifteen (15) - There are 11 unresolved commenters (Kerry Leason, Ken Belding, David Delaquila, Gregg Achman, Thomas Stroud, Don Denton, Bruce Swiecicki, Frank Stanonik, Martin Yan, Ron Smith, Ted Williams) and 7 negative project committee votes (David Delaquila, Armin Rudd, Gregg Gress, Darren Meyers, Thomas Stroud, Ted Williams, David Noyes) on the final vote for publication with unresolved objectors. There were also 5 negative project committee votes (Darren Meyers, David Delaquila, Armin Rudd, Thomas Stroud, Ted Williams) on the vote for the 2nd full PPR.

The commenters focused on a number of issues. Commenters were against:

- assuming steady-state operation
- use of EPA/WHO standards for NO_2 limits
- using generation rates of NO_2 based on the industry ANSI Z21.11.2 standard
- meeting both sections 6.4.3. and 4.1.4 of Standard 62.2

They also expressed concern that:

- the resulting requirements were too restrictive
- other options could be used, such as requiring mechanical exhaust similar to that required for kitchens
- insufficient justification and background material was supplied with the draft language
- the committee could wait until the proposed research, based on a current RTAR, was completed
- 62.2 will not be used in homes that have unvented appliances therefore the committee does not need to address these products
- the six years the committee has spent on this topic represents a “rush to judgement”

These points had been discussed previously in committee, and commenters who were present at the Atlanta 2019 meeting (which included most commenters) were provided an opportunity to address the committee to discuss their objections. The commenters were given an additional opportunity to discuss their reasons with the committee at the May 2019 62.2 Web-meeting. The commenters were also invited to provide changes to the addendum that would address their concerns and additional information to the committee/summaries of their positions if they could not attend the Web-meeting. It should be noted that the key technical issues have been debated by the commenters and the committee for many years – at least since 2014. For this specific addendum, this includes the discussion of negative comments at the Chicago 2018 meeting (that most of the commenters attended) and participation of Dave Delaquila, Don Denton, Tom Stroud, Bruce Swiecicki, Ted Williams and Aykut Yilmaz in the 62.2 Working Group on Unvented Combustion Heaters in 2014/2015. Details of the negative votes and unresolved objections together with committee responses to these issues can be found in the attached documentation.

	See Final Publication Submittal Form for reasons for negative vote. There have been threats of potential legal action if this change is published.
12. Summary of PC Response Unresolved Comments and Negative PC Votes:	PC response to comments – see comment reports. PC Responses to negative PC votes – see ballot tallies.
13. Galley Status:	The Chair has approved the galleys.

Addendum a adds requirements for unvented space heaters

Shaping Tomorrow's Built Environment Today

MANUAL OF PROCEDURES

SOCIETY RULES COMMITTEE

~~December 12, 2008~~
~~Amended May 2013~~
~~Approved, June 2014~~
~~Approved June 23, 2019~~
Approved by SRC June 24, 2020

MANUAL OF PROCEDURES (MOP)
SOCIETY RULES COMMITTEE

1 INTRODUCTION

1.1 This Manual of Procedures (MOP) details the operating procedures followed in carrying out the general responsibilities of the Society Rules Committee (SRC) as prescribed in the ROB.

1.2 The MOP provides a description of some, but not all, of the duties and responsibilities of the SRC chair, members, and staff liaison.

2 GENERAL RESPONSIBILITIES OF THE SRC

~~2.1 Provide information to the Society on the proper conduct of meetings, the rules of order, and the process for changing those rules. The SRC shall prepare training materials as appropriate.~~

2.1~~2~~ Review all changes to Society rules. Preferably this should be done and reported on before Board consideration. Report findings to the Board of Directors in a timely manner.

2.2~~3~~ Review all actions of the Board for consistency with Society rules. (Clarify or return to the Board any actions that are ambiguous or inconsistent with the Rules of the Board).

2.3~~4~~ Initiate, review and/or approve Society ROB and MOP changes as authorized by the Board, including maintenance of the MOPs from those committees listed in Section 8.

2.4~~5~~ Advise all standing bodies when changes to their rule-related documents are needed. Provide oversight and review of the Rules of the Board for all councils and committees.

2.5~~6~~ Implement editorial or minor changes as needed to the Rules of the Board and maintain a Log of those changes. The Log shall be reported to the Board of Directors as an information item.

"ROB 2.424.003.6 When editorial or minor changes are needed to the Rules of the Board, this committee is empowered to make such changes provided they are reported to the Board of Directors at or before its next scheduled meeting. Minor changes generally include matters that do not directly change overall organizational structure, policies or fiscal matters. This committee may designate changes as minor only by unanimous consent."

2.6~~7~~ Maintain a reference manual for the SRC, containing an operational plan for SRC and the regular review of the rules.

2.7~~8~~ Maintain Committee Responsibility (Job Description) documents.

3 MEMBERSHIP

3.1 The membership shall be in accordance with the respective ROB.

3.2 Three (3) of the ~~In addition to the~~ six (6) voting members, ~~a nonvoting liaison should be recruited from each council~~ on the committee should be designated as a

liaison, one (1) for each of the three (3) society councils. ~~This member should represent the council's operations committee.~~

4 RESPONSIBILITIES OF THE CHAIR

4.1 Preside over meetings of the SRC.

4.2 Prepare reports for the Board of Directors and SRC as required.

4.3 Assign a mentor for each new committee member.

4.6 Assign ~~specialties to~~ members to tasks or a specific Volume of the ROB based on their strength~~sen~~ whenever possible~~the committee's skills in each area~~. ~~These specialists~~ Each member should become very familiar with the existing documents and rules to which they are assigned~~that influence and govern their specialty~~. ~~Suggested specialists are~~Assignments are generally made for each Volume of the ROB, MOP, Training materials, and Reference Manual~~Membership, Policy, Procedure, etc~~.

4.4 Designate tasks groups as needed to discharge SRC duties.

4.5 Call additional meetings of the SRC as needed to respond to workload.~~,~~

4.6 Prepare annual Management by Objectives (MBOs)for the SRC.

5 RESPONSIBILITIES OF THE STAFF LIAISON

5.1 Maintain all official SRC reports, correspondence, and documentation of SRC actions taken by committee members individually and collectively.

5.2 Assist the Chair with preparation of the agendas and supporting documentation for SRC meetings, and provide this information to the SRC members prior to the meeting.

5.3 Generate and submit meeting minutes to the Chair for approval prior to distribution to the Committee within 30 days after committee meetings.

5.4 Implement actions approved by the SRC including but not limited to, ROB revisions and Log entries.

5.5 Assist the committee as necessary in the management of rule-related documents including any websites.

5.6 Submit to SRC prior to each SRC meeting (in-person or conference call) a summary of ROB changes made since the last SRC meeting (in-person or conference).

6 RESPONSIBILITIES OF ALL SRC MEMBERS

6.1 Attend all committee meetings.

6.2 Act as a liaison to ~~one or more~~ councils or committees, as assigned. Each council shall have a SRC member liaison assigned each year. Liaisons shall i~~I~~nterface with appropriate subcommittees as needed.

6.3 Keep current on all standing documents and rules approved by the Board of Directors or the membership.

6.4 Fully participate in all assigned activities and complete assignments by the designated time.

7 RESPONSIBILITIES OF COUNCIL LIAISONS

7.1 Represent the interests of the Council

7.2 Assist council with SRC Guidelines for ROB and MOP revisions

7.3 Expedite business between the Council and SRC

8 MOPS ~~MAINTAINED BY SRC~~UNDER THE PURVIEW OF SRC

MOPs approved by SRC		**MOPS maintained by SRC**
• Executive • Finance • Nominating • Planning • President-Elect Advisory • Members Council • Pub & Ed Council • Tech Council • Society Rules	• Building Energy Quotient • Life Members Club • College of Fellows • Audit • Development • Joint Exposition Policy • Scholarship • Foundation	• Society Rules • Manual of Procedures for Officers and Directors

~~8.1 Executive~~
~~8.2 Finance~~
~~8.3 Nominating~~
~~8.4 Planning~~
~~8.5 President-Elect Advisory~~
~~8.6 Government Affairs~~ ~~Scholarship~~
~~8.7 Society Rules~~
~~8.8 Building Energy Quotient~~
~~8.9 Ethics Review Board~~

9. Mentoring Program

The Chair shall assign experienced committee members to serve as ~~a~~ mentors to incoming members for their first year of service and take other actions needed to train and assist new members to be effective in their position.

~~10. Additional Documents~~

~~The following Documents should be read and understood by members of SRC~~

~~10.2 Procedure for Revising Rules (ROB 1.100.002.4)~~

New HQ Named Rooms/Spaces:

Gift Level	Space	Donor
$ 5,000,000	NIBE EDUCATION & TRAINING CENTER	NIBE
Carried Over from Current Headquarters	DAMON & CAROLYN GOWAN TRAINING ROOM	Damon Gowan
$ 500,000	CISCO LAKESIDE LOBBY	Cisco
$ 300,000	ARKEMA CONFERENCE ROOM	Arkema
$ 300,000	ASHRAE EDUCATION SUPPORTED BY THE ASHRAE FOUNDATION	ASHRAE Foundation
$ 250,000	DAIKIN CAFÉ	Daikin Industries Ltd.
$ 250,000	PRICE INDUSTRIES CONFERENCE ROOM	Price Industries
$ 250,000	CLIMACOOL® CONFERENCE ROOM	ClimaCool
$ 250,000	CLIMATEMASTER® CONFERENCE ROOM	ClimateMaster
$ 250,000	NTT CONFERENCE ROOM	NTT
$ 150,000	CISCO TRAINING ROOM	Cisco
$ 150,000	BELIMO TRAINING ROOM	Belimo

$ 150,000	BELL & GOSSETT TRAINING ROOM	B&G
$ 100,000	VICTAULIC LIBRARY	Victaulic
$ 100,000	DAIKIN DECK	Daikin
$ 100,000	MITSUBISHI ELECTRIC TRANE CONFERENCE ROOM	Mitsubishi Electric Trane
$ 100,000	PLACEOS CONFERENCE ROOM	PlaceOS
$ 100,000	BIG ASS FANS CONFERENCE ROOM	Big Ass Fans
$ 100,000	UPONOR CONFERENCE ROOM	Uponor
$ 65,000	PRESIDENT'S OFFICE SUPPORTED BY THE 2018-2021 BUILDING AD HOC COMMITTEE *(3 lines)*	Bldg. Ad Hoc
$ 50,000	EDUCATING THROUGH COLLABORATION – SUPPORTED BY COLLEGE OF FELLOWS AND LIFE MEMBERS CLUB	LMC & COF
$ 40,000	SHUMATE MECHANICAL BALCONY	Shumate Mechanical
$ 25,000	PINNACLE INFOTECH CONFERENCE ROOM	Pinnacle Infotech
$ 25,000	THE SETTY FAMILY FOUNDATION CONFERENCE ROOM	Setty
$ 10,000	ARMACELL DATA CENTER	Armacell
$ 10,000	RESEARCH AIR FLO VIDEO ROOM	Research Air Flo
$ 10,000	DAN ROGERS BREAK ROOM	Dan Rogers

Carried Over from Current Headquarters	CAROLYN KETTERING MOTHER'S ROOM	Bill Harrison
Carried Over from Current Headquarters	GLORIA COFER MOTHER'S ROOM	Bill Harrison
$ 10,000	RUSKIN MEETING ROOM	Ruskin Company
$ 10,000	CHAPMAN COMPANY MEETING ROOM	Chapman Company
$ 10,000	TEKNOFLOR MEETING ROOM	Teknoflor
$ 10,000	AUTOMATED LOGIC CORPORATION MEETING ROOM	Automated Logic Corporation
$ 10,000	TURKISH HVAC&R EXPORTERS MEETING ROOM	Turkish HVAC&R Exporters
$ 10,000	AFS FLEXIBLE DUCT COMPANY MEETING ROOM	AFS Flexible Duct Company
$ 10,000	MOHAWK INDUSTRIES MEETING ROOM	Mohawk Industries
$ 10,000	PRIHODA MEETING ROOM	Prihoda

PLANNING COMMITTEE
MANUAL OF PROCEDURES

Approved by PLC on June 11, 2020

Approved by SRC on June 24, 2020

MANUAL OF PROCEDURES (MOP)
PLANNING COMMITTEE

1 INTRODUCTION

1.1.1 This Manual of Procedures (MOP) details the operating procedures followed in carrying out the general responsibilities of the Planning Committee (PLC) as prescribed in the Rules of the Board (ROB).

1.1.2 The MOP provides a description of some, but not all, of the duties and responsibilities of the PLC chair, members, and staff liaison.

2 RESPONSIBILITIES OF PLC ~~MEMBERS~~

2.1.1 Provide information to the Board of Directors on strategic planning and related activities.

2.1.2 Review the structure and operations of the Society and prepare recommendations for changes as needed.

2.1.3 Advise all standing bodies, committees and councils, on how they can contribute to the strategic planning process.

2.1.4 Maintain a reference manual for the PLC, containing an operational plan for the committee, which shall contain information on the regular review of the strategic plan and supporting documents, as well as other materials necessary for the efficient conduct of PLC business.

2.6 ~~Annual~~ Periodic review of the Rules of the Board pertinent to the operation of PLC with recommendations for changes forwarded to Society Rules Committee for review and approval.

3 RESPONSIBILITIES OF THE CHAIR

3.1.1 Preside over meetings of PLC.

3.1.2 Prepare reports for the Board of Directors and PLC as required.

3.1.3 Assign a mentor for each new committee member.

3.1.4 Designate ad-hoc committees and assign planning committee members tasks as needed to discharge PLC duties.

3.1.5 Call additional meetings of PLC as needed to respond to workload.

3.1.6 Develop MBO's for the PLC for the Society year. ~~in which they are chair.~~

3.1.7 Review the reference manual ~~annually~~periodically.

4 RESPONSIBILITIES OF THE STAFF LIAISON

4.1.1 Maintain all official PLC reports, correspondence, and documentation of PLC actions taken by committee members individually and collectively.

4.1.2 Assist the Chair with preparation of the agendas and supporting documentation for PLC meetings, and provide this information to PLC members prior to the meeting.

4.1.3 Generate and submit meeting minutes to the Chair for approval prior to distribution to the committee within 60 days after committee meetings.

4.1.4 Implement actions approved by PLC.

4.1.5 Assist the committee as necessary in the management of its activities.

5 RESPONSIBILITIES OF ALL PLC MEMBERS

5.1 Attend all committee meetings.

5.2 ~~Act as a liaison to one or more councils or committees or other bodies as assigned.~~ Interface with appropriate councils or committees as needed or as assigned.

5.3 Keep current on all planning-related documents and rules approved by the Board of Directors or the Membership.

5.4 Fully participate in all assigned activities and complete assignments by the designated time.

1. Society Streamlining & Lean Assessment Task Group

"Planning for a More Streamlined ASHRAE"

Report to the ASHRAE BoD

30 June 2020

Task Group Roster

Robin Bryant, Chair
Tim McGinn
Dennis Knight
Costas Balaras
Doug Zentz
Russel Lavitt

ASHRAE is a society of volunteers that year after year counts on members to give their time to carry out the mission of our Society. Our current structure has us reinventing ourselves every year, utilizing valuable members' time refocusing Chapters and their programs to deliver Society's message throughout the Grassroots, is a strain on our resources, and increasing our financial needs. This process slows us down and prevents us from being able to quickly respond to the pace of our industry. If we are going to remain the leader in the built environment, we will need to streamline our process and become more forward thinking. The Task Group recommends that we put more emphasis on the Councils and Regions to free up the Board to focus on strategic direction, rather than management functions. The streamlined Regional structure needs to align with ASHRAE's global initiative, provide better support to the membership, develop more formal training to assist in the development of our future leaders, and improve volunteer time.

The technical side of Society is in the process of implementing a streamlining plan and the Task Group agrees with the direction they are taking. We believe there could be additional improvements if membership input from TC/TG/TRG/MTG groups can be strengthened and more structured. We should foster more

collaboration between our technical groups and optimize their time commitment at conferences. More emphasis should be put on improving the working relationships between Tech Council and the Technical Groups. A significant time savings could be achieved if roster management for TC/TG/TRG/MTG groups can be automated. This would free up some much needed staff time to act as Project Managers to significantly improve our Projects and Committee work. The following report will provide our recommendations on how to achieve these goals.

Preamble

The impact of Coronavirus pandemic is being felt worldwide and is fundamentally affecting how we live, work, learn and communicate. It has been said that the Coronavirus is becoming an accelerator for one of the greatest workplace transformations of our lifetime. How we work, exercise, shop, learn, communicate, and of course, where we work, will be changed forever. This could have a significant impact on how ASHRAE operates and how we attract and serve our membership. Leadership must respond to this challenge by imagining the impact and responding to the "new normal". We have noted that in some areas, the COVID-19 experience has already impacted the Society and has forced a change in how we undertake our business. In the spirit of the assignment given to this task force, it is recommended that lessons learned be gathered from all Society activities occurring since the global lockdown beginning in March 2020 to ascertain what has been successful in undertaking virtual meetings, conferences, or other activities.

SCOPE OF THIS STUDY

This task force has been assigned the study and determination of the following:

1. Based on the 2019-2024 Strategic Plan, this task force is to study an organizational structure that eliminates redundancy, has flexibility to adapt to regional differences, and allocates valued time and resources to the most impactful pursuits. (Initiative #3)
2. Also for consideration is the concept of optimizing ASHRAE's organizational systems and structures to increase capacity, efficiency, and effectiveness. (Goal #3b)
3. At the direction of President Boyce, the task force has undertaken this review through the use of four perspectives:

    a) Restructuring of Committees and Councils (the ASHRAE organizational chart)

    b) Elimination of Society Bureaucracy

c) Streamlining of Society decision making

d) Optimization of volunteer time investments

PART A - Society Grassroots

Society Streamlining Proposed Restructure:

ASHRAE Region: The Regional Structure of ASHRAE works well to transfer information between the Grassroots and Society, provides members with local resources and representation, and allows members to develop the leadership skills required to advance to Society level positions. Our current Regional breakout does not align with ASHRAE's mission of a global Society, so we recommend the following changes to the Regional Structure to better align with our global concept.

TASK 1: Society should be reduced to 6 Regions with each Region having an international element. We have provided a recommended Regional breakout in an attachment, but stopped short in creating the Sub-regions as we felt that the newly formed Regions will have the best insight into their structure.

1. Director and Regional Chair
    a. Sits on the Board of Directors and will take on duties of the former Vice President.
2. Regional Members Council Representatives/Sub-Region Chairs (1 from each sub-region)
    a. The RMCR will conduct the Regional duties of the current DRC and sit on Members Council as the voice of the Sub-Region.
3. 1 RVC for the each of the following: (Reducing the Society Committees to Chair, Vice Chairs and 6 RVCs)
    a. Student Activities
    b. YEA
    c. CTTC
    d. RP
    e. GAC
    f. Membership Promotion
4. 1 ARVC from Sub-Region not represented by an RVC for each of the following:
    a. Student Activities
    b. YEA
    c. CTTC
    d. RP
    e. GAC
    f. Membership Promotion
5. 1 Regionally appointed non-grassroots committee representative:
    a. ECC
    b. Honors and Awards
    c. Historian

6. 1 Regionally appointed non-grassroots committee assistant representative from remaining sub-regions:
    a. ECC
    b. Honors and Awards
    c. Historian
7. Regional Nominating Committee:
    a. Regional Nominating Member
    b. Regional Nominating Alternate
    c. Regional Nominating Reserve Alternate

Regions will have a MEGA CRC yearly for business sessions, Caucus, Regional Officer training, Regional planning, social events, and awards. Workshops will be conducted virtually to make better use of volunteers' time and financial commitment at the Chapter level. The Task Group understands the importance of face to face interaction on the Regional level and have not included elimination of in person CRC workshops, but feel this option should be available.

Cost Savings: $337,500 (Does not include removing Chapter chairs from CRC)

ASHRAE Board: After looking at 13 external case studies on the effective governance size of a non-profit organization similar to ASHRAE, it has been found that Boards bigger than 15 members become ineffective. For every position above this target number, the effectiveness of the board is reduced significantly. Our proposed restructure would reduce the Board of Directors to 15 members, the minimum required by our Consolidation Documents. This group of directors would be responsible for the short term and long term goals of the Society, fostering our Global relationships, and ensuring our sustainable future.

1. To ensure that there is equal representation from both the Grassroots and Technical sides of the Society we recommend the following restructure.
    a. Board of Directors:

President
President-Elect
Treasurer
Executive Vice President* Non-Voting Member

Director & Regional Chair Region 1	Director & Regional Chair Region 2
Director & Regional Chair Region 3	Director & Regional Chair Region 4
Director & Regional Chair Region 5	Director & Regional Chair Region 6
Director-At-Large 1	Director-At-Large 2
Director-At-Large 3	Director-At-Large 4
Director-At-Large 5	Director-At-Large 6

Cost Savings: $96,000

Part - A - The Grassroots Side of ASHRAE - Members Council

Members Council acts on behalf of the Board of Directors within the limits of fiscal and functional authority granted to it by the Board of Directors, implements Society policy, and administers programs, activities, and communication within its organizational structure. It is the voice for grassroots members, Chapters, and Regions to contribute and shape the future of ASHRAE. Members Council has **three standing subcommittees** - Planning, Region Operations, and PAOE.

Planning subcommittee has the responsibility of fiscal planning by way of reviewing and approving the Members Council budget, monitoring fiscal performance, and reviewing the schedule of expenditures for assigned committee programs. This subcommittee is also responsible for long-range and strategic planning while developing and implementing action plans for objectives assigned to Members Council and monitor their programs. Annually, they review and update the council's *Reference Manual, Rules of the Board,* and *Manual of Procedures* along with those of their assigned committees. They also review CRC motions for recommendation to the Council.

Region Operations Subcommittee has the responsibility to compile a list of ideas from Society officers during CRCs that are worth passing on to other Regions, review and update the *Manual for Chapter Operations*, *Manual for Conducting Chapters Regional Conferences, Regions Operation Manual,* including all appendices annually following the fall and spring CRCs. Operations is also responsible for reviewing CRC motions for recommendation to the Council and assignment of new Chapters to a Region.

PAOE Subcommittee is responsible for reviewing the PAOE program and making recommendations to the President-Elect, reviewing PAOE motions from CRCs to make recommendations to the President-Elect and the Council, and the Council Chair assigns one member from each grassroots committee to this subcommittee.

Members Council has **nine assigned committees -** Chapter Technology Transfer, Communications, Conferences and Expositions, Government Affairs, Honors and Awards, Membership Promotion, Research Promotion, Student Activities and Young Engineers in ASHRAE.

Communications identifies the communication, collaboration, and training needs for membership groups, recommends and maintains policies, and ensures that the implementation of information technologies meets the objectives and needs of the Society

Conferences and Expositions provides conference attendees with cost-effective technical and business/professional content, oversees the Winter and Annual Conferences, oversees Topical Conference content and delivery, and provides representation on Joint Expo Policy Committee.

Honors and Awards administers Society-level honors and awards program, provides insight and guidance to Chapters, Regions, and Committees that want to create new awards or change existing ones, defines policies regarding Society honors and awards, and has responsibility for overseeing consistency in implementation of Society honors and awards.

Chapter Technology Transfer provides programs and technical sessions for Chapter and Regions, evaluates Chapter programs, PAOE, CRC workshops, Manual for Chapter chairs and Regional Vice Chair training. They are also responsible to adminters the Distinguished Lecturers Program and oversee Tech Hour webinars.

Government Affairs coordinates dissemination of information regarding federal/national government activities of relevance to ASHRAE members, dissemination of information regarding local and state/provincial government

activities of relevance to ASHRAE members, and encourages active, informed members by keeping governments updated on technical issues.

Membership Promotion publicizes ASHRAE to encourage qualified persons to apply for membership, reviews programs, services, and benefits to members, along with recommendations for improvements to promote membership retention

Research Promotion plans and implements programs to generate funds to support research, educational programs, scholarships, ASHRAE Foundation, and the General Fund.

Student Activities develops programs and tools to promote and encourage engineering careers, oversees Student Grants, Student Design Competitions, K-12 STEM programs, and Post-high student programs. They also develop and manage the Student Congress and oversee the ASHRAE's STEM outreach with other non-profit organizations

Young Engineers in ASHRAE enhances the member experience for ASHRAE members aged 35 or younger by identifying activities and services focused on their needs. They also oversee ASHRAE's outreach with young professionals in other non-profit associations

A total of **six recommendations** are presented next. Each one of them has a short background discussion, summarizes the proposed actions, assigned committees, fiscal Implications and time schedule.

Task 1 Steamline Members Council

The current structure of Members Council has a roster of 23 voting members and 9 reporting committee chairs that are representative of our global diversity. Although there is a lot of work to accomplish on this Council, it should also be streamlined to become more effective.

1. Members Council should be restructured as follows:
    a. Chair remains President-Elect (1)
    b. Vice Chair remains Treasurer (1)
    c. 1 Regional Members Council Representative from each Subregion (12)
    d. 1 Chair from each reporting Committee (9) *Non-voting Members

Cost Savings: $18,000 (positions eliminated were covered under Board travel)

Task 2 Third year RMCRs take on function of Board XO's

Based on history, the Society President has assigned a few members of the board to sit on Members Council each year as both leaders to Members Council, and to provide a stronger conduit from Members Council to the BoD. Given the tasks of this group to streamline ASHRAE, it is of the belief of this task group that this extra need could easily be eliminated with the following. Under the proposed structure of ASHRAE (within this report) each year there would be two RMCRs that would be in their third year of service and most likely would be the leaders of the two sub-committees of Members Council. Additionally, the society President-Elect would still be on Members Council as the head of this group. Thus, the conduit of knowledge to the BoD is still within the structure; plus, the third year RMCRs could be the added voices to the Society President-Elect for added input as to enrich the conduit of knowledge to the Bod. This modification to Members Council would provide the following benefits.

- Streamlining of society as BoD members would be focusing on society direction, rather than membership management.
- This structure adds rich experience to leaders of Members Council for future society leadership on the BoD, as subcommittee leaders would have to contribute more into the overall operation of Members Council each society year.
- This modification to BoD responsibilities would free up their schedules at winter and summer society meetings (helping to shorten each society meeting and add value to each society meeting).

Task 3: Optimize the Reach of Grassroots Initiatives and Programs

The individual committees reporting to Members Council are well organized, provide great value to the membership, and successfully manage a large workload. While the committees have assigned liaisons to the other committees, the interaction between the groups is limited to shared motions and a few scheduled minutes to visit during each other's full committee meetings. There are many areas where the scopes of these committees are similar and opportunities to coordinate efforts to maximize the Society's mission are being lost.

1. Form a Subcommittee Chair Meeting after the full Committees have convened, but before the Members Council Meeting. The Chairs will report their programs and objectives and look for areas to work together to achieve those goals. This group should have several virtual meetings in between the Society meetings to plan and execute their collaborative effort. Since the Chairs are staying to participate in the Members Council meeting, this will not extend the length of time the Chairs are required at the meeting.

Task 4: Eliminate in person Centralized Training

The debate on Centralized Training vs CRC Training has been a long differing of opinion; however, the facts remain strong that with both centralized training (face to face) and CRC training (face to face) we (from a society standpoint) are not training a high percentage of all chapter chairs at the grassroots level. This historical fact is being driven by several items (time to travel by chapter chairs, costs by either chairs or chapters or regions beyond what society funds for travel, and a commitment by the chapters to get all chair positions to at least one of these training events). With the proposed new ASHRAE structure outlined in this report, training of chapter chairs should be done in the following manner. Society should hold virtual centralized training sessions for all chair positions at the grassroots position, and these should include the following:

- Chapter Technology Transfer
- Membership Promotion
- Research Promotion
- Student Activities
- Young Engineers of ASHRAE
- Government Affairs
- Electronic Communications
- Financial Management (Treasurer)

Then each of the six regions should hold their own virtual management sessions to modify (add to) the training for regional needs. These regional sessions would be led by the regional RVC for each area (chapter operations, electronic communications, Honors and Awards, History and financial management would be led by the region's RMCR(s) or appointed Representatives. This method of follow up training would bring the following benefits to society, the region, and the local chapters.

1. Time commitment for each chapter position would be limited to two virtual meetings. This small commitment has already been shown to be a big success with virtual centralized training that just occurred (June 2020).
2. The quality of training would be more consistent, with every chapter position would be required to attend virtual training conducted by society.
3. Regional needs would be satisfied as after centralized training occurs, the chapter chairs would have the chance for regional input, regional mentoring, and a follow session for questions to ensure the training is more complete.
4. All Chapters would be better served as more of their chapter board positions would be trained in a more consistent manner for improved chapter operation, and more consistent year to year presence in their local market.
5. Financially this method of training is a win-win-win for society, each region and each chapter as all travel is eliminated for the training process.

6. This method would also set the stage for each chapter person being trained to understand the society structure and where each region fits in the big picture of ASHRAE globally. Thus it better serves each region for future RVC(s) and regional leadership

On a related topic, the above process would also work well for Chapter President-Elect Training each year. Thus, the same advantages, and cost reductions to society could be seen for each region, the chapters and society as a whole.

Task 5 Budget review per Members Council MOP

In the 2018-2019 Society year the Planning subcommittee was given the MBO to look at the Members Council budget and provide recommendations for cost savings. This process had not been completed since at least 2014 from meeting minutes available on the Council's webpage. During this process it was found that there was no itemized budget by committee available and required contacting each staff liaison resulting in recommendations from the subcommittees for budget cuts. This Council is responsible for making decisions for a large portion of the Society budget, yet the voting members are not provided with the required information to make informed decisions with regard to the operations and future of ASHRAE.

1. It is our recommendation that Members Council Planning perform their function as called out in their MOP. A full budget identifying all program costs should be provided to them at the beginning of the year and work with their reporting committees to meet these requirements.
2. During the Fall Members Council meeting all members of the Council should be provided a status on their budget, so that they are able to make informed decisions while considering motions. This does not take away from the role of the Finance committee, only provide a clear understanding of the programs and finances of the Council.
3. A full review of this Council's MOP needs to be conducted. The current version is dated 6/30/2015 and does not contain up to date information. There are also references to the Reference Manual, but none could be located.

Task 6 Mentorship Programs per section 2.105.002.9 of the ROB

ASHRAE provides great training programs for our Chapter Officers and Chairs, but falls off at the Regional and Society level. There have been several attempts to develop a training program that would respect volunteer time and be effective, but this has not come to fruition. For the volunteers to be effective in their positions, they need to understand what is required from them.

1. We recommend that Board, Councils, Committees, etc. institute the mentorship program identified in the Rules of the Board section 2.105.002.9. These partnerships will not only provide the much needed training that members need, but will reduce the number of calls that staff receive on a daily basis.

PART - B - The Technical Side of ASHRAE - TECH Council

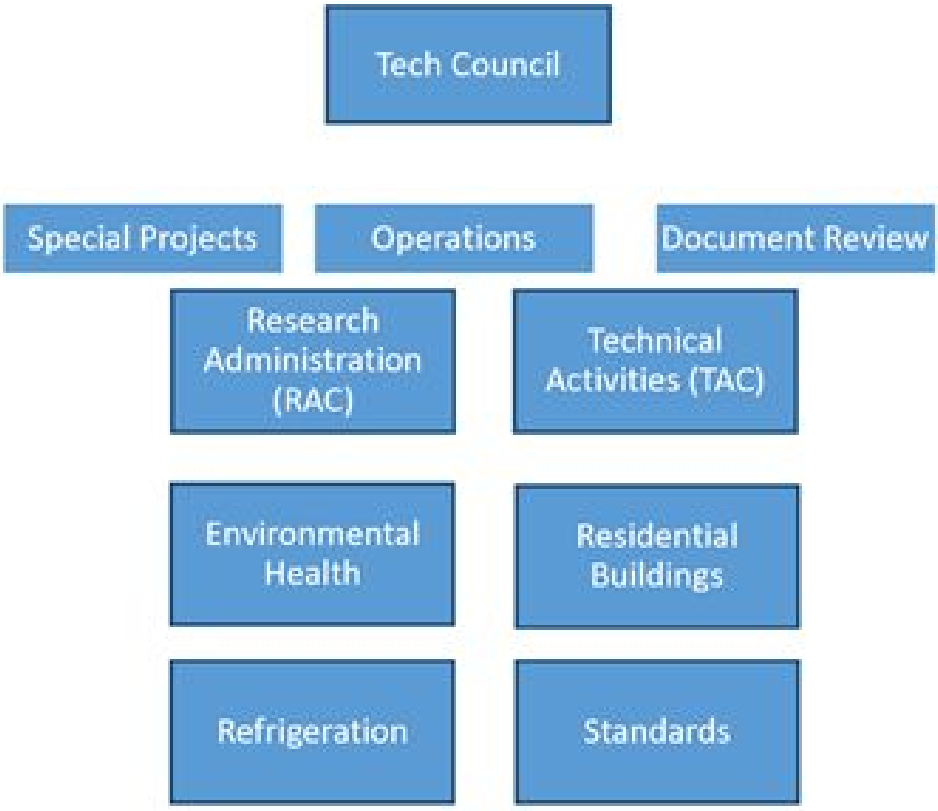
Technology Council provides policy guidance and implements the Society's technical efforts. The Council approves research projects with a total budget up to $200,000 and Standards Committee recommendations. Technology Council has **three standing subcommittees** – Special Projects, Operations and Document Review

Special Projects subcommittee handles activities that might be outside of our research program or standards program. Special Projects usually require accelerated schedules, outside funding and participation with other organizations. Not all co-funded and/or research projects are Special projects but a research project could be a special project. Examples include AEDGs, the residential design guide, and some users manuals. This also includes the design guides that have been developed as part of presidential initiatives such as the Smart Grid Guide

Operations and Planning subcommittee is responsible for upkeep of the procedures related to the Tech Council that includes the ROBS and the MOPS of the Tech Council and the reporting committees. The subcommittee is responsible for tracking the MBOS for reporting committees and the Council as well working to develop MBOS that support the Society Strategic Plan. In addition, they oversee and review the reporting committee budgets and Council budgets.

Document Review subcommittee reviews the position documents that express Society's views on current issues important to members. The subcommittee also reviews the issue briefs (short one to two page documents) that are created by the Government Affairs Committee (GAC). They may also review Emerging Issues briefs (e.g. "ASHRAE Issues Statements on Relationship Between COVID-19 and HVAC in Buildings" developed by the Environmental Health Committee) and provide feedback on the Washington Internship for Students of Engineering (WISE) Paper.

Technology Council has **six assigned Committees** – Environmental Health, Refrigeration, Research Administration, Standards, Residential Building Committee, Technical Activities. The Committees develop procedures for recommending updates to Strategic Plan on a continuous basis. Each Committee submits a report to the Council on the current status of each activity that supports Society's Strategic Plan and makes recommendations for changes to the Strategic Plan.



Research Administration Committee (RAC) is responsible for the research and technical studies to the Society. It conducts and coordinates basic research and technical studies for the Society in the fields of HVAC&R. Projects that exceed $200K are presented to the Board for consideration and approval.

Environmental Health Committee (EHC) identifies environmental health trends impacting practice of HVAC&R, and makes recommendations on new activities and policies in responses to these trends. It serves as a resource to the Society on activities and issues that relate to environmental health impacts of building environmental control technologies. EHC also draws on experts outside of ASHRAE that includes health professionals.

Refrigeration Committee (REF) encourages the advancement of refrigeration technology and its application for Comfort- Process-Cold Chain (REF-CPCC) represents the "R" in ASHRAE.

Technical Activities Committee (TAC) coordinates the appointment, development, and oversight of Technical Committees (TCs), Task Groups (TGs), Technical Resource Groups (TRGs), and Multidisciplinary Task Groups (MTGs). The 110+ Technical Committees are grouped in **ten Sections** (Section 1.0 - Fundamentals and General; Section 2.0 - Environmental Quality; Section 3.0 - Materials and Processes; Section 4.0 - Load Calculations and

Energy Requirements; Section 5.0 - Ventilation and Air Distribution; Section 6.0 - Heating Equipment, Heating and Cooling Systems and Applications; Section 7.0 - Building Performance; Section 8.0 - Air-Conditioning and Refrigeration System Components; Section 9.0 - Building Applications; Section 10.0 - Refrigeration Systems). TAC Cooperates and coordinates with the Conferences and Expositions Committee (CEC), Chapter Technology Transfer Committee (CTTC), Communications Committee (ECC), Handbook, Program, Refrigeration, Research, Special Publications, Standards, and other relevant Committees.

Standards Committee is responsible for the selection, development, preparation, and submittal to the BOD of all codes, standards and guidelines. It submits to the BOD for its approval for publication any standards, guidelines, and addenda that have unresolved objectors to ensure the ASHRAE approved ANSI rules have been followed. It cooperates with and supervises participation in other organizations in development, preparation, and adoption of codes, standards, and guidelines.

RECOMMENDATIONS

A total of **eight recommendations** are presented next. Each one of them has a short background discussion, summarizes the proposed actions, assigned committees, fiscal Implications and time schedule.

Task 1 Strengthen TC/TG/TRG/MTG Member Input for Process Improvement

Currently the procedure to solicit TC/TG/TRG/MTG input for process improvement is primarily handled through the Section Heads who represent the interest of their Section to TAC and they are responsible for ensuring that their opinions and views are made known. The process is primarily casual, where through their interactions with the functional groups, the Section Head solicits input and feedback from the groups in his section. There are little to no instances of TC's or Sections developing and submitting motions on process or policy improvements up through the chain, although the TC breakfast is the official forum for this.

To facilitate process improvement from the grassroots up, we need to have a more formal process that pulls input from the Technical Grassroots volunteers. Process and Procedure streamlining Improvement should come from member motions submitted (e.g. using the Activity Form). A better method is required to have technical groups or sections generate, review, debate and vote on improvement and streamlining suggestions. These motions would then be attached to Minute Cover Sheets, posted prior to a general business session (the TC breakfast), and presented to the Section heads for debate, discussion, and voting. Approved motions would then be forwarded to RAC and then Tech Council. The TC Breakfast could be the feedback mechanism to notify the TC's what has happened to their motions.

Timing needs to be developed by TAC; TC meeting (or Section meeting) generates motions, transmitted to section heads before breakfast, distributed to Section TC Chairs at breakfast or before to give time to consider,

then voted on and brought to TAC. This will require TAC to develop the procedures and revise MOP and Reference Manual accordingly.

Action could be assigned to; TAC under direction of Tech Council

Fiscal Implications; Cost to develop minimal, savings to ASHRAE for process improvement to be determined

Schedule; 1 year

Task 2 Automate TC/TG/TRG/MTG Roster Management

Currently the process of Group Chairs (or their designate) update their rosters online through a simple program. This data generates a spreadsheet for each group which is used by staff to manually generate the Rosters in the ASHRAE Database. This takes one to one and a half full time staff a year to undertake roster management. An outside programmer is required to create a program to port the TC Roster inputs directly to the ASHRAE database and relieve staff of manual management. This could reduce staff time or allow their time to be repurposed.

Action could be assigned to; Staff assisted by outside contract programmers..

Fiscal Implications; Cost to implement assumed to be $3k staff time, $15k outside programming. Savings to ASHRAE estimated at $108,000 per year (1800 saved hrs per year, at a staff salary plus burden of $60/hr. A 2 month simple payback.

Schedule; 6 months

Task 3 Reduce Research Project Duration

Currently Research Projects have an average duration of 20 months. There is indication that this could be due for an overhaul. To facilitate process improvement there is a need to simplify the policies and procedures for proposals, awards, monitoring and closeouts.

1. Focus on moving at the speed of business could be best accomplished by providing more staff involvement as project managers, wrangling the volunteers, and relieving some key responsibilities from the volunteers. If staff were used as project managers it would improve effectiveness, timing and reduce research contract prices. There is potentially a good case study to be made using Lilas Pratt's more recent work with different projects and studying the results in comparison to volunteer led projects. This demonstrates a business case for increasing staff involvement as project managers and streamlining processes including volunteer involvement. A percentage of research project costs (a markup) would fund the project manager (PM) involvement, i.e. a percentage on top of all research projects (PM fee). Anecdotally there is an understanding that research bids are higher than needed as contractors cover

their risk associated in dealing with the ASHRAE 'machine'. Staff indicate there are no rules that would prohibit this.

2. PM's to expand Basecamp and/or Google Docs use and remote meeting capabilities to facilitate more timely collaboration and organization.

   Action could be assigned to; RAC

   Fiscal Implications; Cost neutral if staff costs are balanced and tracked against Research Project PM markup level. Reduction of Research Project schedules and better results is the goal.

   Schedule; Could immediately be implemented on a trial basis as new Research projects are put out to bid.

Task 4 Optimize Standard Project Committee (and Handbook) Timelines

Currently the average time for publishing a new standard is six to seven years. To facilitate process improvement there is a need to expedite the process. Some elements of these suggestions originating from discussions with Standards staff would also apply to Handbook chapter contributions and updates or other special publications.

1. Overhaul how committees meet as ASHRAE doesn't have enough staff to attend every Standards Project Committee meeting at the winter and annual conference, this slows down progress significantly. Committee and Subcommittee meetings outside the normal Annual or Winter meeting times should be mandated to expedite the process.
2. Staff recommends following a model from NFPA. In that model, the Committee gets an outline draft of the Standard complete and circulated to the committee after the first meeting. It is less technical content but more of having the initial outline and formatting set. Then scheduled milestones would be set to flush out the outline and staff would provide PM guidance and direction to meet the schedule. *See Task 3.1 above*.

   Action could be assigned to; Staff

   Fiscal Implications; Quicker to market for Standards and Handbooks should improve publication sales and be more time responsive to the industry needs of a standard or other ASHRAE publications.

   Schedule; 6 months to implement

Task 5 Develop and Institute Consistent TC Committee Chair Training

Currently there is no official **T**C/TG/TRG/MTG chair training during the annual and winter meetings. As a result there has been a notable decline in the quality of senior leadership meetings as members advancing were not trained in Robert's Rules, meeting protocols and expectations. To facilitate process improvement there is a need to study this issue further in order to identify the training gaps for various areas of ASHRAE that are lacking in

order to be filled using Virtual Training of the chairs after appointments are made. *ASHRAE Staff (Training Coordinator) could help provide this review and provide recommendations.*

Action could be assigned to; Tech Council Section Heads

Fiscal Implications; Some staff coordination time estimated at $2k.

Schedule; 5 months to develop effective program

Task 6 Increase Technical Group Collaboration

Currently TC/TG/TRG/MTG meet and conduct their business during the annual and winter meetings, with minimal interaction or other communication in between Society meetings. To facilitate process improvement there is a need to mandate a minimum of four annual meetings of the ASHRAE Technical Groups (Committees and Subcommittees) to promote timely collaboration and effectiveness. Winter meeting would be designated as a face to face meeting for members (virtual participation for corresponding members), Spring and fall meetings would be virtual meetings, Gathering for the Annual meeting would be face to face with required participation from non-attending members and Corresponding members virtually.

Action could be assigned to; Tech Council

Fiscal Implications; Difficult to determine; Reduced registration revenue from reduced Annual Meeting TC/TG/TRG/MTG attendance, although most participants do not register for the meeting, since this is not mandatory, if they are only engaged in these group meetings. In any event, this could be partially or wholly offset by increased TG participation and effectiveness, reduced time to market of products and research developed by TC's.

Schedule; 5 months to develop effective program

Task 7 Decrease Winter and Annual Meeting Times

Currently several of our members have been discussing and requesting some attention to the issue of reducing the duration of the Annual and Winter Meetings. There is also renewed interest in deleting in its entirety or switching permanently to a virtual Annual Meeting. This task stops short of making a recommendation for deleting or going virtual with the Annual Meeting, but presents the opportunities from tightening the timeline of both meetings. Shortened meeting times could improve employer support by reducing time away from the office and also reducing costs for hotels and meals without reducing meeting attendance, and encourage member engagement by reducing time away from family. To facilitate process improvement there is a need to

1. Eliminate, reschedule all Friday meetings.

2. Encourage all Subcommittee Meetings to be rescheduled to occur virtually and complete their work before the meeting. It is accepted that some of the larger subcommittees feel strongly that face to face meetings are required and these should be accommodated.
3. Eliminate, reschedule or hold virtually before the meetings all Saturday and Wednesday Technical Group Meetings (TC, TRG, MTG, SPC, SSPC). This movement will be assisted by the TC consolidation efforts that are underway.
4. Open Registration and Bookstore on Saturday instead of Friday.
5. Open ASHRAE Headquarters on Saturday instead of Friday.
6. Eliminate Certification Exams Scheduled on Wednesdays.
7. Eliminate all meetings after the Wednesday Board Meeting.

Action could be assigned to; CEC/Staff

Fiscal Implications; Difficult to determine; TBD by CEC

Schedule; 5 months to develop effective program

Task 8 Increase Annual Meeting Vibrancy and Profitability

Currently the Society is experiencing for the first time and as a result of unforeseen circumstances a Virtual Summer Meeting. Instead of deleting the Annual Meeting in its entirety or switching permanently to a virtual Annual Meeting this task proposes re-aligning the theme of the Annual meeting to widen its interest, attract additional attendees and migrate it towards a profitable conference. To facilitate process improvement it is recommended to

1. Create a rotating set of Conference themes such that every "x" number of years the theme is used to attract new attendees to the conference which normally would not attend. Or; Move three or four of ASHRAE's Topical Conferences so they each coincide with the Annual Meeting as a "Conference within a Conference" while still maintaining the Annual Meeting Technical Program. Arrange the Specialty conferences so that they rotate through the Annual Meeting on a two or three year rotation.

   and/or

2. Focus and Expand the Residential Committee Technical Program Efforts (Residential Track) to the Annual Meeting potentially collaborating with other organizations. For example,the Society can work with an allied organization within the residential building sector to create both a technical program (Residential Super Track) on residential buildings and incorporate a new Residential Technology Expo, recognizing it would be subject to the initial limitations of 20,000 square feet mandated by the AHR Expo agreement.

   Action could be assigned to; CEC, Residential Committee

Fiscal Implications; Difficult to determine; TBD by CEC and Residential Committee, additional revenue from more attendees, residential focused attendees, specialty conference attendees, Technology Expo.

Schedule; 12 months to develop effective program and plan

PART - C - The Product and Services Side of ASHRAE - Pub Ed Council

The restructuring of the Publishing and Education Council (PEC) has been recently completed. Its goals were;

- Reshape the role of PEC and its subcommittees' functions
- Efficient use of volunteer and staff time
- More effectively use volunteer talent and knowledge to provide direction on all publication and education member products
- Improve communication and planning between all things publication and education related
- Build in an evaluation process of committee progress on Council and Society Strategic Plan
- Organize in a logical manner all ASHRAE PEC responsibilities
    - Staff transition
    - New responsibilities as ASHRAE evolves and adds services

TPEC has four standing subcommittees – Fiscal, Planning, Products and Professional Development.

Fiscal Subcommittee manages the budget, monitors revenue and expenses and reviews for potential efficiencies. They provide data to help drive decisions in advertising, sales and potential products. They manage the Job Board, Supplier Directory and the Supplier Webinars.

Planning Subcommittee sets the strategic direction of the council and develops the MBOs. It prioritizes resource allocations and ensures alignment with the Society Strategic Plan. They identify future PEC leadership and maintains the MOP & ROB for the Council and assists the standing committees as a resource for rule interpretation, motions, MBOs and with the recommended actions when goals are not met

Products Subcommittee monitors, plans, and reviews products for the Bookstore and Portals and the point of contact for other society publications. The standing committees that report to Products are Handbook. Publications, Historical, and the Research Journal Subcommittee.

Professional Development Subcommittee provides monitoring and planning for the Training and Education Committee and the Certification Committee.

This AdHoc has not reexamined PEC in light of the recent restructuring as the purpose and results of the efforts closely follow the AdHoc charge.

PART D - **Optimizing Volunteer Time Investments**

The membership of this sub-task endeavored to read through a number of older reports commenting on the above topic. Of greatest use was a document created understood to have been created in 2014 by a task force led by Sheila Hayter as Chair and Gordon Holness as Vice-Chair. Membership included other significant contributors to ASHRAE, such as Hugh Crowther, Sarah Maston, Ross Montgomery, Mick Schwedler and Staff Liaison Joyce Abrams.

This document spoke to the creation of eight recommendations based on the concepts of bettering the volunteer experience and increasing the number of volunteers. These were listed in order of priority, from high to low and were included in our recommendations throughout the report.

1. Improve the volunteer experience by making it enjoyable, technically satisfying, efficient, and effective; perhaps by reducing bureaucracy and unnecessary administrative process and/or operations. The intent of this recommendation was to streamline day-to-day volunteer interaction to make the experience less challenging and cumbersome.

2. Suggest TCs meet annually in person and quarterly via conference call. The intent of this recommendation was to ensure better interaction amongst the membership of the TCs.

3. Shorten the business meeting at the Annual and Winter Conferences by at least one day. The intent of this recommendation was to shorten time commitments away from home at the Conferences.

4. Provide formal Chair training. The intent of this recommendation was to ensure chairs are adequately trained in the operation of their Committees and the use of Robert's Rules to undertake discussion.

5. Provide viable options for remote attendance at Conferences and meetings. The intent of this recommendation was to reduce travel requirements and the associated time commitments.

6. Streamline the Handbook and Standards processes. The intent of this recommendation was to accelerate processing of revisions, additions, or changes to these documents from a multi-year process to something much more efficient.

7. Develop a short program on volunteering at a Society level. The intent of this recommendation was to ensure general membership familiarity with volunteering on a Society level, rather than chapter and regional level volunteering.

PART E - **Increase efficiency of winter and annual conferences by reducing volunteer time, staff time, and financial expenditures at Winter and Annual conferences by at least 20%.**

This task group looked at many existing resources along with contacting members within ASHRAE which had prior experience related to this task. The following is a listing of this work.

- Appointment to Society Streamlining and Lean Assessment Task Group from Darryl Boyce dated October 1, 2019
- Existing ASHRAE Structure documentation

- Report to BOD on January 15, 2019 from Sarah Maston on ASHRAE Functional Group Re-Organization
- RAL Sub Region B Strategic Planning Ad Hoc Report on January 17, 2017
- Update on TC Reorganization report dated 11/2019
- Initiative 2A – Volunteer Time Management Report from Tom Phoenix's Ad Hoc committee on the "Effective Use of Volunteer Time"
- Sheila Hayter's "Chapter Volunteerism & Engagement Report" from David Underwood's Ad Hoc on "Chapter Volunteerism and Engagement"
- "Consolidation of Winter and Annual Meetings – Final Report" by Eric Binder and Blake Ellis dated June 2017
- Russell Lavitt had a conference call with Sheila Hayter to discuss the outcome of the Chapter Volunteerism and Engagement Ad Hoc report referenced above.
- Dennis Knight requested detailed conference cost breakdowns from prior annual and winter conferences – ASHRAE Staff is gathering this information and plans to have it available on or about 1/21/2020.

Recap of thoughts to date

- Following the suggestions within several of the reference documents, all TC, MTG, Task Group, etc. subcommittees should complete their work prior to the annual and winter conferences to reduce the amount of meeting space required and the time to complete the business of ASHRAE at these conferences.
- If the above is implemented, the next step would be to reduce the time of the annual conference. Within the report referenced above by Eric Binder and Blake Ellis, there is an outline of a reduced annual conference format which greatly reduces the meeting room requirements which would provide an opportunity for a shorter conference to many attendees(an unintended consequence could be to potentially reduce attendance due to shorter individual time commitments)
- The annual conference is a valuable element of ASHRAE; thus, it should continue. However, based on multiple suggestions, the "annual conference theme" could be different from the winter conference with respect to the technical program and the targeted audience/participants by re-focusing ASHRAE's annual conference. Examples of this include (but are not limited to) the following:
    - Incorporating existing "topical conferences" within the annual conference (conference within a conference)
    - Joining other organizations to create a co-conference experience. An example of this would be organizations within the residential building sector to create both a technical program on residential buildings and an EXPO (initially within the AHR Agreement limits) where vendors within the residential building industry could contribute an attraction to the conference much like the winter AHR EXPO.
    - Create a rotating set of themes such that every "x" number of years the theme is used to attract new attendees to the conference.

- Based on the current need to hold ASHRAE's 2020 Annual Summer Conference another possible approach for ASHRAE is to create a blended approach to future Annual Summer Conferences. The blend would consist of the following so we would also meet the State of New York's requirement on 100 members present to witness the voting of the newly elected officers.

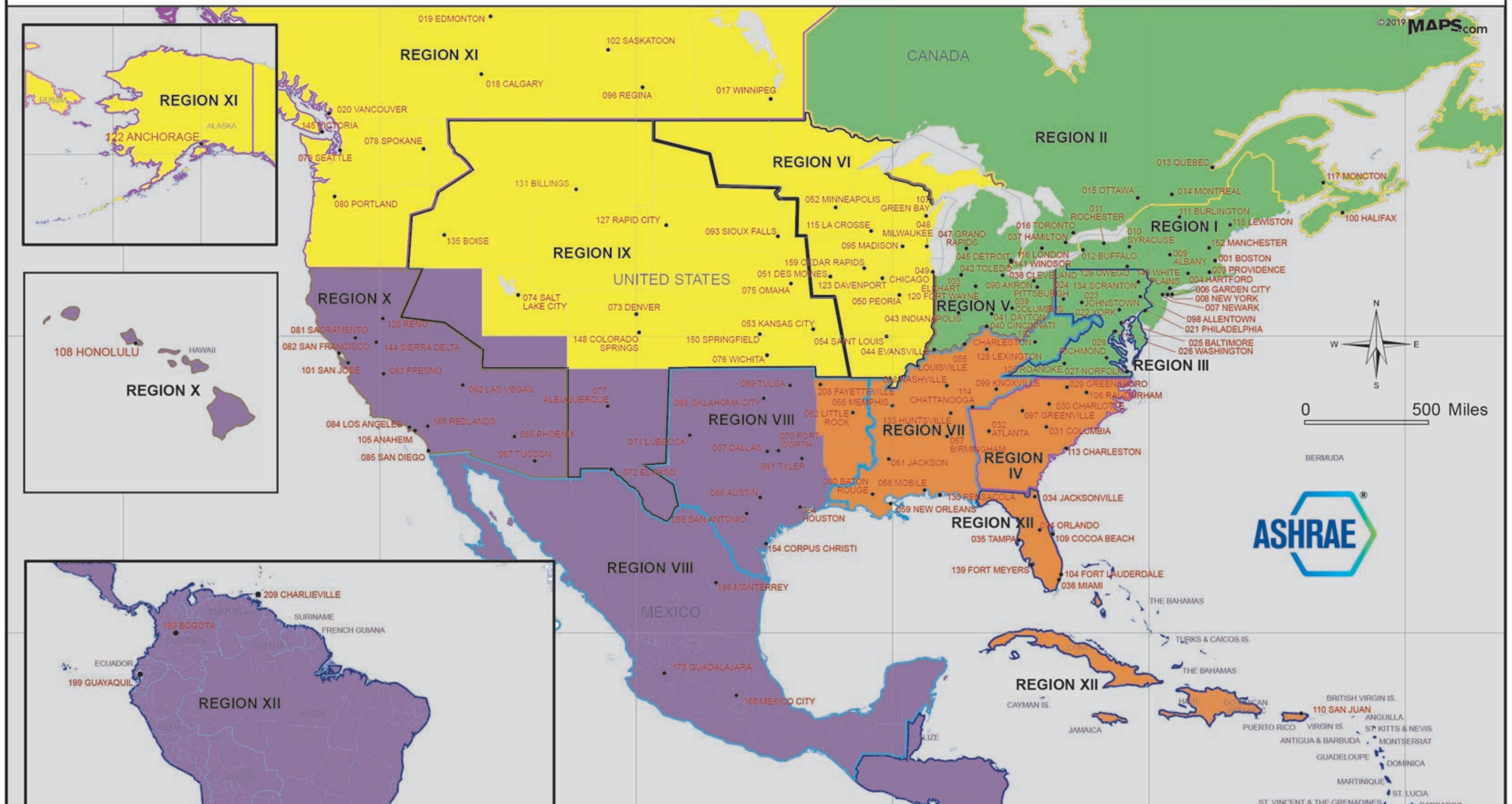
    - All tech sessions, and other sessions which require registration would be held via virtual sessions.
    - TC groups and all sub-committee work would be prior to the conference via virtual means
    - The only groups which would hold their core committee meetings face to face would be all committees that report directly to theBOD
    - The result of this would greatly reduce the people attending and guarantee over 100 people present. It would also probably create a 3-day conference, and here is how I would envision this conference.
        - Starts on a Friday morning with committee work and continues until a Plenary session around 3 pm
        - Social events could occur Saturday evening, but I would hope they would be toned down
        - Saturday would consist of the first BOD meeting, President's Luncheon, and Council meetings
        - If regional dinners are to occur (questionable) they would be done on Saturday evening
        - Sunday would be reserved for any other meetings and the final BOG meeting to finish the conference
        - This would greatly reduce the cost to society and create a "Leaner" environment for ASHRAE
- Expand the ASHRAE Learning experience with more Certification programs, exams, CEU offerings, and other learning potential (e.g. a DL program so members which have not been able to experience DL presentations have the option to attend some of ASHRAE's best presenters).
- Increase Training potential for chapter members to attract members which may not attend for other reasons (examples include GAC Chair, CTTC Chair, YEA Chair, etc..)

Region	Chapter #	Chapter
I	001	BOSTON
I	003	RHODE ISLAND
I	004	CONNECTICUT
I	006	LONG ISLAND
I	007	NEW JERSEY
I	008	NEW YORK
I	009	NORTHEAST
I	010	CENTRAL NEW YORK
I	011	ROCHESTER
I	012	NIAGARA FRONTIER
I	111	CHAMPLAIN VALLEY
I	118	MAINE
I	129	TWIN TIERS
I	146	BI-STATE
I	152	GRANITE STATE
II	013	QUEBEC
II	014	MONTREAL
II	015	OTTAWA VALLEY
II	016	TORONTO
II	037	HAMILTON
II	100	HALIFAX
II	116	LONDON
II	117	NB/PEI
II	141	WINDSOR
III	021	PHILADELPHIA
III	022	CENTRAL PENNSYLVANIA
III	023	JOHNSTOWN
III	024	PITTSBURGH
III	025	BALTIMORE
III	026	NATIONAL CAPITAL
III	027	HAMPTON ROADS
III	028	RICHMOND
III	098	LEHIGH VALLEY
III	125	ROANOKE
III	134	ANTHRACITE
IV	029	NORTH PIEDMONT
IV	030	SOUTHERN PIEDMONT
IV	031	SOUTH CAROLINA
IV	032	ATLANTA
IV	097	GREENVILLE
IV	106	TRIANGLE
IV	113	CHARLESTON
V	038	CLEVELAND
V	039	COLUMBUS
V	040	CINCINNATI
V	041	DAYTON
V	042	TOLEDO
V	043	CENTRAL INDIANA
V	044	EVANSVILLE
V	045	DETROIT
V	047	WESTERN MICHIGAN
V	090	AKRON/CANTON
V	103	NORTHERN INDIANA
V	120	FORT WAYNE
VI	048	WISCONSIN
VI	049	ILLINOIS
VI	050	CENTRAL ILLINOIS
VI	051	IOWA
VI	052	MINNESOTA
VI	054	SAINT LOUIS
VI	095	MADISON
VI	107	NE WISCONSIN
VI	115	LA CROSSE AREA
VI	123	MISSISSIPPI VALLEY
VI	159	CEDAR VALLEY
VII	055	LOUISVILLE
VII	056	MEMPHIS
VII	057	BIRMINGHAM
VII	058	MOBILE
VII	059	NEW ORLEANS
VII	060	BATON ROUGE
VII	061	MISSISSIPPI
VII	088	NASHVILLE
VII	099	EAST TENNESSEE
VII	114	TENNESSEE VALLEY
VII	128	BLUEGRASS
VII	130	NORTHWEST FLORIDA
VII	133	NORTH ALABAMA
VII	192	WEST VIRGINIA
VIII	062	ARKANSAS
VIII	064	HOUSTON
VIII	065	ALAMO
VIII	066	AUSTIN
VIII	067	DALLAS
VIII	068	CENTRAL OKLAHOMA
VIII	069	NE. OKLAHOMA
VIII	070	FORT WORTH
VIII	071	WEST TEXAS
VIII	091	EAST TEXAS
VIII	154	SOUTH TEXAS
VIII	165	MEXICO CITY
VIII	166	MONTERREY
VIII	173	GUADALAJARA
VIII	208	NORTHWEST ARKANSAS
IX	053	KANSAS CITY
IX	072	EL PASO
IX	073	ROCKY MOUNTAIN
IX	074	UTAH
IX	075	NEBRASKA
IX	076	WICHITA
IX	077	NEW MEXICO
IX	093	SOUTH DAKOTA
IX	127	BLACK HILLS AREA
IX	131	BIG SKY
IX	135	IDAHO
IX	148	PIKES PEAK
IX	150	OZARKS
X	081	SACRAMENTO VALLEY
X	082	GOLDEN GATE
X	083	SAN JOAQUIN
X	084	SOUTHERN CALIFORNIA
X	085	SAN DIEGO
X	086	CENTRAL ARIZONA
X	087	TUCSON
X	092	SOUTHERN NEVADA
X	101	SAN JOSE
X	105	ORANGE EMPIRE
X	108	HAWAII
X	126	NORTHERN NEVADA
X	144	SIERRA DELTA
X	155	TRI COUNTY
XI	017	MANITOBA
XI	018	SOUTHERN ALBERTA
XI	019	NORTHERN ALBERTA
XI	020	BRITISH COLUMBIA
XI	078	INLAND EMPIRE
XI	079	PUGET SOUND
XI	080	OREGON
XI	096	REGINA
XI	102	SASKATOON
XI	122	ALASKA
XI	145	VANCOUVER ISLAND
XII	034	JACKSONVILLE
XII	035	FLORIDA WEST COAST
XII	036	MIAMI
XII	094	CENTRAL FLORIDA
XII	104	GOLD COAST
XII	109	SPACECOAST
XII	110	PUERTO RICO
XII	139	SOUTHWEST FLORIDA
XII	172	BRASIL
XII	178	ARGENTINA
XII	190	COLOMBIA
XII	196	CHILE
XII	199	ECUADOR
XII	202	PARAGUAY
XII	209	ASHRAE CARICOM
XII	213	SOUTH BRAZIL
XIII	142	SINGAPORE
XIII	143	HONG KONG
XIII	149	MALAYSIA
XIII	157	TAIWAN
XIII	167	PHILIPPINES
XIII	170	THAILAND
XIII	183	INDONESIA
XIII	194	JAPAN
XIII	195	SOUTH KOREA
XIII	198	MACAO
XIV	168	HELLENIC
XIV	176	DANUBE
XIV	177	PORTUGAL
XIV	182	SPAIN
XIV	203	CYPRUS
XIV	204	IRELAND
XIV	205	UK MIDLANDS
XIV	206	UK LONDON AND SOUTH-EAST
XIV	214	ISRAELI
RAL	158	INDIA
RAL	160	SAUDI ARABIA
RAL	161	CAIRO
RAL	162	LEBANESE
RAL	163	WESTERN INDIA
RAL	164	KUWAIT
RAL	169	ASHRAE BANGALORE
RAL	171	SRI LANKAN
RAL	174	PAKISTAN
RAL	175	ASHRAE FALCON
RAL	179	NORTHERN PAKISTAN
RAL	181	BAHRAIN
RAL	184	QATAR ORYX
RAL	185	CHENNAI
RAL	186	PUNE
RAL	187	ASHRAE NIGERIA
RAL	188	ASHRAE MUMBAI
RAL	189	CENTRAL PAKISTAN
RAL	191	ASHRAE DECCAN
RAL	193	TURKISH
RAL	197	BANGLADESH
RAL	207	SOUTH AFRICA
RAL	210	FAISALABAD
RAL	211	PYRAMIDS
RAL	212	JORDAN

Region XII also includes: Central America and South America

Region XIII also includes: Australia, Vietnam, China, and New Zealand

Region-At-Large also includes: Africa, Middle East, and Western Asia



Region	Section Name	Location	Sponsoring Chapter
I	No Chapter Sections		
II	No Chapter Sections		
III	Shenandoah	Shenandoah, VA	Roanoke
IV	Macon	Macon, GA	Atlanta
IV	Myrtle Beach	Myrtle Beach, SC	Charleston
IV	Savannah	Savannah, GA	Charleston
IV	Hickory	Hickory, NC	Southern Piedmont
V	Northern	Traverse City, MI	Western Michigan
VI	Northern Lights	Fargo, ND	Minnesota
VI	Rochester	Rochester, MN	Minnesota
VI	Rockford	Rockford, IL	Illinois
VII	No Chapter Sections		
VIII	Cancun	Cancun, MEX	Mexico City
VIII	Queretaro	Queretaro Arteaga, MEX	Mexico City
VIII	Rio Grande Valley	McAllen, TX	South Texas
IX	Lincoln	Lincoln, NE	Nebraska
IX	Great Falls	Great Falls, MT	Big Sky
IX	Northern	Fort Collins, CO	Rocky Mountain
IX	Bozeman	Bozeman, MT	Big Sky
X	Redwood Empire	Napa, CA	Golden Gate
X	Western	Santa Barbara, CA	Southern California
XI	Southern Interior	Kelowna, BC, CAN	British Columbia
XI	Fairbanks	Fairbanks, AK	Alaska
XI	Willamette	Willamette, OR	Oregon
XII	Sarasota-Bradenton	Sarasota, FL	Florida West Coast
XII	Lima Peru	Lima, PER	Florida West Coast
XII	Tallahassee	Tallahassee, FL	Jacksonville
XII	Costa Rica	San Jose, CRI	Florida West Coast
XII	Panama	Panama, PAN	Region XII
XII	Dominican Republic	Santo Domingo, DOM	Region XII
XII	Bolivia	Santa Cruz de la Sierra, BOL	Region XII
XIII	Kuching	Kuching, Sarawak, MYS	Malaysia
XIII	Guam	Tamuning, GUM	Philippines
XIII	Penang	Penang, MYS	Malaysia
XIII	Myanmar	Yangon, MMR	Region XIII
XIV	Scotland	Glasgow, Scotland	Region XIV
XIV	UK-Northern	Northern England	Region XIV
XIV	Northern Hellas	Thessaloniki, GRC	Hellenic
RAL	East India	Kolkata, W. Bengal, IND	India
RAL	Jaipur	Jaipur, Rajasthan, IND	India
RAL	Oman	Muscat, OMN	ASHRAE Falcon
RAL	Amaravathi	Vijayawada, Andhra Pradesh, IND	ASHRAE Deccan