



Shaping Tomorrow's
Built Environment Today

MINUTES (DRAFT)

**Refrigeration Committee Technology Committee
for
Comfort, Process, and Cold-Chain
(REF-CPCC)
Spring Meeting,
Wednesday April 1st, 2020
Web Meeting**

These minutes have not been approved and are not the official, approved record until approved by this committee.

MEMBERS PRESENT:

Rajan Rajendran, *Chair*
Yunho Hwang, *Vice-Chair*
Walid Chakroun
Didier Coulomb – Joined Late?
Martin Dieryckx – Joined 12:48 pm
Ayman Eltalouny
Stephen Gill
Charles Hon
Dustin Lilya
Carlos Alberto Mitroga
William Walter
Sarah Maston, *BOD Ex-O*

GUESTS: None

MEMBERS NOT PRESENT:

Tony Welter
Malcolm Knight, CO

ASHRAE STAFF:

Mike Vaughn, MORTS

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MOTIONS

| No. | Motion | Page |
|-----|--|------|
| 1 | 2020 REF-CPCC Committee minutes from the 2020 winter meeting be approved. Motion Passed 9-0-2-1(12) CNV SG/WC | 1 |
| 2 | Motion to adjourn meeting - Motion Passed 10-0-1-1(12) CNV MD/YH | 15 |

NEW ACTION ITEMS – Spring 2020 – Meeting

| No. | Responsibility | Action Item | Status/ Page |
|-----|-----------------------------|---|-----------------|
| 1 | (All Sub. Chairs and Staff) | Select meeting start times, meeting duration, and days to poll for a subcommittee web meeting in April or May for each of the eight REF-CPCC Subcommittees and notify Mike Vaughn so he can generate the meeting polls and set-up the web meeting in order to be able to report at REF-CPCC Virtual Annual meeting | New / 3 |
| 2 | Gill | Send two Program Subcommittee Objectives for this year to staff for Ref-CPCC MBOs spreadsheet | New / 3 |
| 3 | Hwang | Explore with Research Subc. the following focus areas for possible REF-CPCC research projects: Health & Wellness, Food Safety, Loss, and Waste | New / 4 |
| 4 | Maston | Find out additional information on why the Comfort Cooling Award was cancelled by Members Council and the Board in Orlando. | New / 4 |
| 5 | Ayman/Staff | Investigate why Donald A. Siller Refrigeration Award is administered by Chapter Technology Transfer Committee (CTTC) and not REF-CPCC. <u>Answer:</u> This award recognizes exceptional performance by a <u>Chapter Refrigeration Chair</u> for planning activities and providing technology transfer about refrigeration to chapters. | New / 4 |
| 6 | Maston/Staff | Check to see if Rules of the Board could be modified to allow most recent Past Chair to be a non-voting consultant position on SY 20-21 roster or if Society budget constraints will not allow for this change now. | NEW / 4 |
| 7 | Staff | Add to agenda for next REF-CPCC meeting (Virtual Annual) a discussion on how to formalize permanent representatives on REF-CPCC for International bodies. | NEW / 7 |
| 8 | Staff | Set-up web meeting for the 1 st week May for Rajan, Yunho, Martin, Didier & Sarah to discuss Organizational representatives on REF-CPCC. | NEW / 7 |

| | | | |
|----|--------------------------------|--|-----------------|
| 9 | All Members | Help to find speakers for World Refrigeration Day (WRD) webinar if possible & help promote webinar. 90-minute webinar with 5-7 speakers. Ayman heading webinar Subc. so, pass-on possible speaker names to him. https://www.ashrae.org/about/news/2020/ashrae-supports-world-refrigeration-day-2020 | NEW / 5 |
| 10 | Staff | Add Bill Walter and Adan Ayub to R in ASHRAE Subc. and share R-ASHRAE webpage link with R in ASHRAE Subc. Link: https://www.ashrae.org/technical-resources/refrigeration | Complete/ 5 |
| 11 | Staff | Double check subcommittee rosters to make sure they have been updated to include all new volunteers from Orlando meeting | NEW / 5 |
| 12 | Staff | Add latest TC Scopes document to REF-CPCC Basecamp | Complete/ 5 |
| 13 | Gill/Staff | Send e-mail request to full REF-CPCC roster and meeting attendees asking for program ideas for 2021 Winter meeting | On-going / 5 |
| 14 | Chair/Gill/Ayman/ IIAR rep. | Form small working group to implement recommendation to add Ammonia to Refrigerants and Responsible Use Position Document. Doug Scott volunteered help find IIAR Rep. May 2020 Target end date for this effort. | On-going / 5 |
| 15 | Gill/ Staff | Send information on Real Zero Refrigerant Training – Free online training course – open to all - send to all. | Complete/ 6 |
| 16 | Hon | Work with the Government Affairs Committee Chair to establish Liaisons between with REF-CPCC and GAC. | On-going/ 6 |

CARRYOVER ACTION ITEMS – Winter 2020 – Meeting

| No. | Responsibility | Action Item | Status |
|------------|----------------------------|--|---------------|
| 2 | Chair/Staff | Need better communication method to Regions. Invite all seven current Regional Refrigeration Vice Chairs (RVCs) to next REF-CPCC meeting. | On-going |
| 3 | Chair/Staff | Explore the possibility of having a representative from each region on REF-CPCC or a regular newsletter in order to better communicate with regions. A motion to add RVCs to REF was rejected by Members Council a few years ago. | On-going |
| 4 | Chair/Gill/Staff | Investigate if REF-CPCC leadership and Program Subc. can help identify Distinguished Lecturer (DL) topics & speakers and then take up with CTTC for approval. https://www.ashrae.org/communities/chapters/distinguished-lecturers | On-going |
| 6 | Ayman/Staff | Re-educate Society on new scope for REF-CPCC with help from ASHRAE Marketing and R in ASHRAE webpage. | On-going |
| 7 | Staff | Get list of current RVCs from Trent and add to distribution list for REF-CPCC interested parties | On-going |
| 8 | R in ASHRAE Subc. | R in ASHRAE subc. create regular communication document targeted to RVCs. Also, develop training session material for RVCs at CRCs – Invite to attend REF-CPCC meetings too. | On-going |
| 13 | Gill/Staff | Send e-mail request to full REF-CPCC roster and meeting attendees asking for program ideas for 2021 Winter meeting | On-going |
| 14 | Chair/Gill/Ayman/IIAR rep. | Form small working group to implement recommendation to add Ammonia to Refrigerants and Responsible Use Position Document. Doug Scott volunteered help find IIAR Rep. May 2020 Target end date for this effort. | On-going |
| 16 | Hon | Work with the Government Affairs Committee Chair to establish Liaisons between with REF-CPCC and GAC. | On-going |

LIST OF ACRONYMS

| | | | |
|--------|---|----------|---|
| AI | Action Item | MORTS | Manager of Research & Technical Services |
| ASHRAE | American Society of Heating, Refrigerating and Air-conditioning Engineers | MOU | Memorandum of Understanding |
| BOD | Board of Directors | MTG | Multidisciplinary Task Group |
| CNV | Chair Not Voting | OPS | TechC Operations Subcommittee |
| CTTC | Chapter Technology Transfer Committee | PAOE | Presidential Award of Excellence |
| DRSC | TechC Document Review Subcommittee | PD | Position Document |
| Ex-O | Ex-Officio | RatRU | Refrigerants and their Responsible Use |
| GCCA | Global Cold Chain Alliance | REF-CPCC | Refrigeration Technology Committee for Comfort, Process, and Cold-Chain |
| IIR | International Institute of Refrigeration | SY | Society Year |
| IoR | Institute of Refrigeration | TAC | Technical Activities Committee |
| MBO | Management by Objectives | TC | Technical Committee |
| MOP | Manual of Procedures | UNEP | United Nations Environment Programme |

**Refrigeration Committee Technology Committee
for
Comfort, Process, and Cold-Chain
(REF-CPCC)
Spring Meeting,
Wednesday April 1st, 2020
Web Meeting**

1. CALL TO ORDER

Chair Rajan Rajendran called the meeting to order at 12:00 PM ET. Members and guests introduced themselves. Staff confirmed quorum.

2. ASHRAE CODE OF ETHICS COMMITMENT

In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, inclusiveness and respect for others, which exemplify our core values of excellence, commitment, integrity, collaboration, volunteerism and diversity, and we shall avoid all real or perceived conflicts of interests.

(Code of Ethics: <https://www.ashrae.org/about/governance/code-of-ethics>)

(Core Values: <https://www.ashrae.org/about/ashrae-s-core-values>)

4. REVIEW OF AGENDA

Program Subcommittee Objectives for this year still need to be defined for this year in committee MBOs.

How can REF-CPCC contribute in the COVID 19 battle? Ayman reminded committee of the UNEA food loss & waste – cold chain connection to safety. See Orlando Minutes Attachment G - “Promoting Sustainable Practices and Innovative Solutions for Curbing Food Loss and Waste” for more information.

Walid update on GAC

5. MINUTES

MOTION #1

It was moved (SG) and seconded (WC) that,

- (1) the minutes from the 2020 REF-CPCC Orlando Meeting be approved.

BACKGROUND: Minutes were distributed on March 30th via email from staff.

MOTION 1 PASSED: 8-0-1-3 (12), CNV

6. CHAIR’S REPORT – Rajendran

The primary purpose of the REF-CPCC spring meeting was to continue to take steps to launch the following eight new subcommittees for REF-CPCC by making plans for their spring 2020 web meetings:

New REF-CPCC Subcommittee Structure:

1. Program - Chair: **Stephen Gill** – Members: Coulomb, Kazachki, Ravi, Miyara, Hwang
2. Research – Chair: **Yunho Hwang** – Members: Ayub, Nawaz, Chakroun
3. HVAC – Chair: **Walid Chakroun** – Members: Hourahan, Abdelaziz, Kujak
4. Cold Chain – Chair: **Dustin Lilya** – Members: Ayub, Hon, Scott
5. R in ASHRAE – Chair: **Didier Coulomb** – Members: Rajendran, Selbert, Walter, Ayub
6. Refrigeration Technology Report – Chair: **Martin Dieryckx** – Members: Rajendran, Welter, Kazachki, Zha, Ayub
7. MTG.RAC – Chair: Carlos Mitroga – Alternates: #1 Chakroun, #2

8. Award Subcs – Briley and Garland- Chair: **Ayman Eltalouny** – Members: Dieryckx, Hon, Mitroga

Review of complete & on-going action items from the Orlando meeting:

Orlando AI#1 Revise committee Rules of Board (ROB), Reference Manual (REF), and Manual of Procedures (MOP) to reference new committee name and acronym (Refrigeration Technology Committee for Comfort, Process, Cold-Chain) – REF-CPCC – Status: **Complete** see Basecamp for latest approved versions of each document under Folder F. Ref. Info. & Procedures

Orlando AI #2 Chair/Staff – Need better communication method to reach ASHRAE Regions. Invite all seven current Regional Refrigeration Vice Chairs (RVCs) to next REF-CPCC meeting - Status: **On-going**

Orlando AI #3 Chair/Staff - Explore the possibility of having a representative from each region on REF-CPCC or a regular newsletter in order to better communicate with regions. **Note: A motion to add RVCs to REF was rejected by Members Council a few years ago** - Status: **On-going**

Orlando AI #4 Chair/Gill/Staff - Investigate if REF-CPCC membership and Program Subc. can help identify Distinguished Lecturer (DL) topics & speakers and then take up with CTTC for approval. - Status: **On-going** – Information on past speaker lists and topics developed by REF-CPCC years past is now posted to REF-CPCC spring meeting folder in a subfolder titled **Past Speakers Lists**.

Orlando AI #5 Staff - Check with Steve H. to see if we still have a list of potential DL topics and speakers that was created in the past or list of research topics created in past. - Status: **Complete** See AI#4 above update.

Orlando AI #6 Ayman/Didier/Staff - Re-educate Society on new scope for REF-CPCC with help from ASHRAE Marketing and R in ASHRAE webpage. - Status: **On-going**

Orlando AI #7 Staff - Get list of current RVCs from Trent and add to distribution list for REF-CPCC interested parties- Status: **Complete**

Orlando AI #8 Didier/Staff - R in ASHRAE subc. create regular communication document targeted to RVCs. Also, develop training session material for RVCs at CRCs – Invite to attend REF-CPCC meetings too. - Status: **On-going**

Orlando AI #9 Staff - Get current Distinguished Lecturer list and post to REF-CPCC Basecamp. - Status: **Complete** – Links to list on ASHRAE website included in spring meeting agenda

Orlando AI #10 Staff - Get copy of TC Chair Breakfast meeting Presentation and post to REF-CPCC Basecamp - Status: **Complete** – See 2020 Orlando meeting information folder on Basecamp.

Orlando AI #11 Staff - Add Bill Walter and Adan Ayub to R in ASHRAE Subc. and share R-ASHRAE webpage link with R in ASHRAE Subc. - Status: **Complete**

Orlando AI #12 Staff - Add latest TC Scopes document to REF-CPCC Basecamp - Status: **Complete** – See Folder E. TAC Info. in REF-CPCC spring meeting Docs & Files folder.

Orlando AI #13 (Staff) - Send e-mail request to full REF-CPCC roster and meeting attendees asking for program ideas for discussion in Austin and presentation in Chicago 2021 - Status: **On-going** – Spring 2020 Program Subc. meeting could be used to draft this request

Orlando AI #14 Staff - Form small working group to implement recommendation to add Ammonia to Refrigerants and Responsible Use Position Document. Doug Scott volunteered help find IAR Rep. May 2020 target end date for this effort. - Status: **On-going**

Orlando AI #15 Gill/Staff - Send information on Real Zero Refrigerant Training – Free online training course - Status: **Complete** - <https://ior.org.uk/careers/real-zero-refrigerant-emissions-and-leakage-reduct>

7. BOD Ex-Officio REPORT – Maston

REF-CPCC Board ExO, Sarah Maston, gave update on the Orlando Conference and Board meeting. The Board motion to drop the Comfort Cooling Award, which REF-CPCC administers for the Society, due to no nominations in the last five years was discussed.

The question was also raised why is the Donald A. Siller Refrigeration Award is administered by Chapter Technology Transfer Committee (CTTC) and not REF-CPCC?

Answer: This award recognizes exceptional performance by a Chapter Refrigeration Chair for planning activities and providing technology transfer programs about refrigeration.

The Draft SY 20-21 REF-CPCC roster was also discussed briefly and idea of having the past REF-CPCC Chair on the committee as a voting member or consultant the year immediately after her/his chair term. This change will require a Rules of the Board change. We would also need a similar change in order to have permanent Organizational Representatives on REF-CPCC.

8. SUBCOMMITTEE SPRING MEETINGS

SPR20 AI # 1 (All Sub. Chairs and Staff) – Select meeting start times, meeting duration, and days to poll for a subcommittee web meeting in April or May for each of the eight REF-CPCC Subcommittees and notify Mike Vaughn so he can generate the meeting polls and set-up the web meeting in order to be able to report at REF-CPCC Virtual Annual meeting

1. Staff update on New Subcommittees:

See **ATTACHMENT A** below for further information on each Subcommittee and current membership of each. The subcommittee information now includes a table showing the availability of subcommittee members based upon their home time zone that can be used to help poll for a subcommittee meeting.

2. MTG RAC Plant Assessment Guide

REF-CPCC joined the new MTG.RAC Plant Assessment Guide and named Carlos Mitroga as voting member and Walid Chakroun as Alternate #1. Both have since been added to the MTG.RAC roster and should be getting MTG meeting information now. Three additional Alternates (Welter, Lilya, and Gill) have been named since the Orlando meeting

3. Program Subcommittee

Subcommittee Chair: Stephen Gill reported that February 10th is the deadline for Austin Conference program submissions. The topic of recruiting more distinguished lecturers on Refrigeration Technology topics was also discussed.

SPR20 AI # 2 (Gill) - Send two Program Subcommittee Objectives for this year to staff for Ref-CPCC MBOs spreadsheet

4. Research Subcommittee

Subcommittee Chair: Yunho Hwang reported that committee does not have any active research projects underway or in development yet but mentioned that the next generation compressor might be based on electro-chemical compression if we wish to explore this technology further. Goal is to create collaborative research program with TCs. Adnan Ayub, Walid Chakroun, and Kashif Nawaz volunteered to join the subc. during meeting.

SPR20 AI #3 (Hwang) - Explore with Research Subc. the following focus areas for possible REF-CPCC research projects: Health & Wellness, Food Safety, Loss, and Waste

5. Awards Subcommittee

Subcommittee Chair: Ayman Eltalouny reported SY18-19 Briley Award was presented at this meeting to Dr. Abu-Heiba of Oak Ridge National lab for his ASHRAE Journal article *Setting Charge Limits for Flammable Refrigerants* published in the July 2018 (Vol. 60 (7)) edition of the ASHRAE Journal.

The subcommittee also reported that they conducted a 5-year review of the Comfort Cooling Award and Milt Garland Award at the request of Honors and Award Committee. No nominations for the Milt Garland award or the Comfort Cooling Award were submitted in the last 4 years, but the subc. recommended that both awards continue.

Note: Staff learned at the Wednesday Board meeting in Orlando that Honors and Awards Committee recommended to the Board through Members Council that the Comfort Cooling Award should be dropped due to low interest. The Board approved H&A's recommendation.

SPR20 AI #4 (Sarah) - Find out additional information on why the Comfort Cooling Award was cancelled by Members Council and the Board in Orlando.

SPR20 AI #5 (Ayman/Staff) - Investigate why Donald A. Siller Refrigeration Award is administered by Chapter Technology Transfer Committee (CTTC) and not REF-CPCC.

Answer: This award recognizes exceptional performance by a Chapter Refrigeration Chair for planning activities and providing technology transfer about refrigeration to chapters.

SPR20 AI #6 (Sarah) - Check to see if Rules of the Board could be modified to allow most recent Past Chair to be a non-voting consultant position on SY 20-21 roster or if Society budget constraints will not allow for this change now.

SPR20 AI #7 (Staff) – Add to agenda for next REF-CPCC meeting (Virtual Annual) a discussion on how to formalize permanent representatives on REF-CPCC for International bodies.

SPR20 AI #8 (Staff) - Set-up web meeting for the 1st week May for Rajan, Yunho, Martin, Didier & Sarah to discuss Organizational representatives on REF-CPCC

We now have as pass through awards from Honors & Awards Committee for the Briley Award and the Milt Garland Award to select.

6. Refrigeration Technology Report

Subcommittee Chair - Martin Dieryckx reported that Goal is to create every 2 years an update on refrigeration technology on the global level and to identify what technology is most important or promising now. Information from this report will also be shared with the TCs to help keep the Refrigeration Handbook Volume up to date and relevant to today's engineers.

Target member for subcommittee is a manager of technical issues based anywhere in the world for broad international representation. Focus will not be on new refrigerants but on new and established technologies. Result from this subcommittee could possibly be the basis for an ASHRAE Tech Hour webinar presentation.

7. Cold-Chain

Subcommittee Chair – Dustin Lilya reported that a new application for cold chain technology is concrete cooling. Doug Scott, Adnan Ayub, Charlie Hon, volunteered to join the subc. It was also suggested that IIR and IIAR should be encouraged to join the subc. also

8. HVAC

Subcommittee Chair – Walid Chakroun reported that he plans to recruit at least three members and is finalizing subcommittee scope statement. First goal will be document latest technology related to heat pumps. Glenn Hourahan, Omar Abdelaziz and Steve Kujak volunteered to join the Subcommittee during the meeting. Walid also suggested that we should ask TechC to look at all information we have to help control Corona virus out-break and send to all regions.

10. POSITION DOCUMENT UPDATES REPORTS

A. Refrigerants and Responsible Use PD

Implement recommendation to add ammonia to Refrigerants and their responsible use PD Working Group members: Rajan, Steven Gill, IIAR representative identified by Doug Scott is Dave Rhule.

Scheduled to expire now June 21, 2021. April 1 or May Target end date for this effort.

B. Ammonia as a refrigerant PD – expired Feb. 1, 2020

12. OTHER INFORMATION

World Refrigeration Day is on Friday June 26, 2020 this summer

<https://www.ashrae.org/about/news/2020/ashrae-supports-world-refrigeration-day-2020>

SPR20 AI #9 (ALL MEMBERS) - Help to find speakers for World Refrigeration Day (WRD) webinar if possible & help promote webinar. 90-minute webinar with 5-7 speakers. Ayman heading webinar Subc. so, pass-on possible speaker names to him.

SPR20 AI #10 (Staff) - Add Bill Walter and Adan Ayub to R in ASHRAE Subc. and share R-ASHRAE webpage link with R in ASHRAE Subc.

SPR20 AI #11 (Staff) - Double check subcommittee rosters to make sure they have been updated to include all new volunteers from Orlando meeting.

SPR20 AI #12 (Staff) - Add latest TC Scopes document to REF-CPCC Basecamp

SPR20 AI #13 (Gill / Staff) - Send e-mail request to full REF-CPCC roster and meeting attendees asking for program ideas for 2021 Winter meeting

SPR20 AI #14 (Chair/Gill/Ayman/ IIAR rep.) - Form small working group to implement recommendation to add Ammonia to Refrigerants and Responsible Use Position Document. Doug Scott volunteered help find IIAR Rep. May 2020 Target end date for this effort.

SPR20 AI #15 (Staff) - Send information on Real Zero Refrigerant Training – Free online training course – open to all - send to all.

13. STRATEGIC ISSUES

SPR20 AI #16 (Hon) – Work with the Government Affairs Committee Chair (Walid now) to establish Liaisons between with REF-CPCC and GAC.

14. NEXT MEETING – TBD due to COVID-19 Emergency

15. ADJOURNMENT

MOTION #2

It was moved (MD) and seconded by (YH) that, the meeting adjourn

MOTION #2 PASSED: 10-0-1-1 (12), CNV

ATTACHMENT A

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| REF-CPCC Awards Subcommittee | | | |
|-------------------------------------|---|---------------------|--------------------|
| Scope: | REF-CPCC Awards Subcommittee will develop award recipient recommendations each year for the Briley and Garland awards and possibly develop new refrigeration related awards. | | |
| Chair: | Ayman Eltalouny – ayman.eltalouny@unep.org – Ph. 0097317825110 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Ensure wider engagement of Ref. Committee members in the process of judging the Briley and Garland Awards | | |
| Objective #2 | Map existing ASHRAE awards and recommend other award categories in relation to the scope of the Refrigeration Committee | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Ayman Eltalouny, Chair | ayman.eltalouny@unep.org | 0097317825110 | UNEP |
| Martin Dieryckx | dieryckx.m@daikineurope.com | 477663625 | Daikin |
| Charles Hon | chon@truemfg.com | (636) 240-2400x1383 | True Mfg. |
| Carlos Mitroga | cmitroga@danfoss.com | 56228978811 | Danfoss |
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AWARDS Subcommittee Meeting Start Time Options based upon home base locations of members:

| Ayman | Martin | Charlie | Carlos | TBD | TBD | TBD |
|--------------|---------------|----------------|---------------|------------|------------|------------|
| 4pm | 3pm | 8am | 10am | | | |
| 5pm | 4pm | 9am | 11am | | | |
| 6pm | 5pm | 10am | 12pm | | | |
| 7pm | 6pm | 11am | 1pm | | | |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| Cold Chain Subcommittee | | | |
|--------------------------------|---|---------------------|--------------------|
| Draft Scope: | REF-CPCC Cold Chain Subcommittee will research and study current topics related to temperature-controlled supply chain and disseminate this new information to a broader audience through collaboration with the Program, Research subcommittees or through other organizations. | | |
| Chair: | Dustin Lilya - dlilya@dcengineering.net – Ph. (208) 288-2181 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Recruit and form the Subcommittee membership and define roles responsibilities for the committee members. | | |
| Objective #2 | Reach out to cold chain community and collect information on relevant current topics of interest <u>Food Safety and Food Security</u>. Communicate the relevant topics to the other stakeholders (Research and Program Committees) | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Dustin Lilya, Chair | dlilya@dcengineering.net | (208) 288-2181 | DC Engineering |
| Adnan Ayub | adnan@iso-therm.com | (817) 472-9922 | Isotherm Inc. |
| Charles Hon | chon@truemfg.com | (636) 240-2400x1383 | True Mfg. |
| Doug Scott | dscott@vacomtech.com | (909) 374-1113 | VaCom Technologies |
| Alaa Olama | alaaolama@gmail.com | +201006099950 | Montreal Protocol |
| Michael Saunders | Mike.saunders@emerson.com | 937-726-4928 | Emerson |
| Ayman Eltalouny | ayman.eltalouny@unep.org | 0097317825110 | UNEP |

COLD CHAIN Subcommittee Meeting Start Time Options based upon home base locations of members:

| Doug | Dustin | Adnan | Charlie | Mike S. | Alaa | Ayman |
|-------------|---------------|--------------|----------------|----------------|-------------|--------------|
| 7am | 8am | 9am | 9am | 10am | 4pm | 5pm |
| 8am | 9am | 10am | 10am | 11am | 5pm | 6pm |
| 9am | 10am | 11am | 11am | 12pm | 6pm | 7pm |
| 10am | 11am | 12pm | 12pm | 1pm | 7pm | 8pm |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| HVAC Subcommittee | | | |
|------------------------------|--|---------------------|--------------------------|
| Scope: | REF-CPCC Comfort Cooling and Heating Subcommittee will research and study current topics related to comfort cooling in the refrigeration spectrum and disseminate this information to a broader audience through collaboration with the Program, Research subcommittees or through other organizations. | | |
| Chair: | Walid Chakroun – wchakroun@gmail.com – Ph. 0096599587712 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Identify councils, committees, subcommittees and other entities within ASHRAE that may help meeting the scope of the HVAC subcommittee | | |
| Objective #2 | Work with ASHRAE CEC and other organizations to document and disseminate HVAC workshops, seminars and conferences related to comfort cooling. | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Walid Chakroun, Chair | wchakroun@gmail.com | 0096599587712 | Kuwait Univ. |
| Glenn Hourahan | ghoura@comcast.net | (703) 625-2522 | Hourahan Consulting, LLC |
| Omar Abdelaziz | omar.abdel.aziz@gmail.com | (865)387-0725 | Oak Ridge National Lab |
| Steve Kujak | skujak@trane.com | (608) 787-3766 | Trane |
| | | | |
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| | | | |
| | | | |

HVAC Subcommittee Meeting Start Time Options based upon home base locations of members:

| Walid | Omar | Glenn | Steve | TBD | TBD | TBD |
|--------------|-------------|--------------|--------------|------------|------------|------------|
| 3pm | 2pm | 8am | 7am | | | |
| 4pm | 3pm | 9am | 8am | | | |
| 5pm | 4pm | 10am | 9am | | | |
| 6pm | 5pm | 11am | 10am | | | |

Our Research Ideas: Refrigerant Leakage Study

1. Evaluate the HVAC system performance degradation due to refrigerant leakages
2. A comprehensive study on the HVAC components that further contribute to leakages
3. Determination and analysis specific improvements that can reduce specific leakages within the vapor-compression cycle

Other ideas:

- Thermal performance prediction and analysis on the economized vapor injection air-source heat pump in hot climate region of Middle East.
- Application characteristics of variable refrigerant flow heat pump system with vapor injection in severe hot region
- Exergo-economic analysis and optimization of two-stage vapor injected system for cooling applications
- Charge-sensitive modeling of vapor compression systems for off-design performance simulation
- Rooftop air-conditioning unit performance improvement using refrigerant circuitry optimization
- Investigation of Nano-lubricants Applied to Residential Air Conditioning System

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| Program Subcommittee | | | |
|----------------------|---|---------------------|-------------------------|
| Scope: | REF-CPCC Program Subcommittee will develop technical programs of various types (Technical Paper Sessions, Conference Paper Sessions, Seminars, Debates, Forums, Panels, and workshops) for the REF-HRAC committee that can be presented at Society meetings or at other organizations conferences. The subcommittee will also work with other Society committees and other organizations to co-sponsor programs that jointly benefit both committees or organizations. | | |
| Chair: | Steven Gill - ASHRAE@stephencgill.com – PH: 1949850651 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | TBD | | |
| Objective #2 | TBD | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Steven Gill, Chair | ASHRAE@stephencgill.com | 1949850651 | Stephen Gill Associates |
| Didier Coulomb | d.coulomb@iifir.org | 33142273235 | IIFIR |
| Dr. Georgi Kazachki | kazachki@comcast.net | (678)576-7135 | CRYOTHERM Consulting |
| Gurunarayana Ravi | gurunarayana.ravi@lennoxind.com | (281)907-2901 | Lennox |
| Prof. Akio Miyara | miyara@me.saga-u.ac.jp | 81952288623 | |
| Prof. Yunho Hwang | yhhwang@umd.edu | (301) 405-5247 | U. Maryland |

Program Subcommittee Meeting Start Time Options based upon home base locations of members:

| Didier | Steven | Georgi | Yunho | Ravi | Akio | TBD |
|---------------|---------------|---------------|--------------|-------------|-------------|------------|
| 2pm | 1pm | 8am | 8am | 7am | 9pm | |
| 3pm | 2pm | 9am | 9am | 8am | 10pm | |
| 4pm | 3pm | 10am | 10am | 9am | 11pm | |
| 5pm | 4pm | 11am | 11am | 10am | 12pm | |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| Research Subcommittee | | | |
|------------------------------|---|---------------------|--------------------|
| Scope: | REF-CPCC Research Subcommittee will develop research projects for bid that support and advance the scope of REF-HRAC (via RTARs, WS, TRPs, and RPs) The subcommittee will also work with other Society committees and outside organizations to co-sponsor research projects that jointly benefit both committees or organizations. | | |
| Chair: | Yunho Hwang – yhhwang@umd.edu – Ph. 301-405-5247 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | <p>New! - Develop list of suggested refrigeration research topics for consideration by the new Research Advisory Panel (RAP) so that they can be included in new Research Strategic Plan for Society.</p> <p>Recruit Research Subcommittee members, brainstorm research topics, and develop RTARs</p> | | |
| Objective #2 | <p>Reach-out to specific TC research subcommittee chairs and work towards developing cooperative research program.</p> | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Yunho Hwang, Chair | yhhwang@umd.edu | (301) 405-2025 | U. Maryland |
| Adnan Ayub | adnan@iso-therm.com | (817) 472-9922 | Isotherm Inc. |
| Kashif Nawaz | nawazk@ornl.gov | (865) 574-9338 | DOE- ORNL |
| Walid Chakroun | wchakroun@gmail.com | 96599587712 | Kuwait Univ. |
| | | | |

Research Subcommittee Meeting Start Time Options based upon home base locations of members:

| Yunho | Kashif | Adnan | Walid | TBD | TBD | TBD |
|--------------|---------------|--------------|--------------|-----|-----|-----|
| 8 am | 8 am | 7 am | 3 pm | | | |
| 9 am | 9 am | 8 am | 4 pm | | | |
| 10 am | 10 am | 9 am | 5 pm | | | |
| 11 am | 11 am | 10 am | 6 pm | | | |
| 12 pm | 12 pm | 11 am | 7 pm | | | |
| 1 pm | 1 pm | 12pm | 8 pm | | | |
| 2 pm | 2 pm | 1 pm | 9 pm | | | |
| 3 pm | 3 pm | 2 pm | 10 pm | | | |
| 4 pm | 4 pm | 5 pm | 11pm | | | |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| R in ASHRAE Subcommittee | | | |
|---------------------------------|--|---------------------|----------------------------------|
| Scope: | REF-CPCC R in ASHRAE Subcommittee will be responsible for maintaining the “R in ASHRAE” web page on the ASHRAE website and with developing new content for this webpage on a regular basis. | | |
| Chair: | Didier Coulomb – d.coulomb@iifir.org – Ph. 33142273235 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Identifying ASHRAE technical committees involved in refrigeration issues and their activities | | |
| Objective #2 | Identifying ASHRAE technical committees involved in refrigeration issues and their activities | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Didier Coulomb, Chair | d.coulomb@iifir.org | 33142273235 | Intl. Institute of Refrigeration |
| Rajan Rajendran | Rajan.Rajendran@emerson.com | (937) 726-0620 | Emerson |
| Rachel Selbert | rachel.selbert@icf.com | (202) 791-8879 | EPA/ENERGY STAR |
| Bill Walter | Bill.Walter@carrier.com | (315) 657-7407 | Carrier |
| Adnan Ayub | adnan@iso-therm.com | (817) 472-9922 | Isotherm Inc. |
| | | | |

R in ASHRAE Subcommittee Meeting Start Time Options based upon home base locations of members:

| Didier | Rachel | Bill | Rajan | Adnan | TBD |
|---------------|---------------|-------------|--------------|--------------|------------|
| 1pm | 7am | 7am | 7am | 6am | |
| 2pm | 8am | 8am | 8am | 7am | |
| 3pm | 9am | 9am | 9am | 8am | |
| 4pm | 10am | 10am | 10am | 9am | |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| Refrigeration Technology Bi-Annual Report Subcommittee | | | |
|---|--|---------------------|----------------------|
| Scope: | REF-CPCC Bi-Annual Refrigeration Technology Report Subcommittee will develop every other year the bi-annual Refrigeration Technology Report for publication and distribution. | | |
| Chair: | Martin Dieryckx - Dieryckx.m@daikineurope.com – Ph. 0477663625 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Define the scope and basic structure of the bi-annual report | | |
| Objective #2 | Organize the required membership of the subcommittee in order to prepare the report in SY20-22 | | |
| Subc. Members: | | | |
| Name | Email | Phone Number | Affiliation |
| Martin Dieryckx, Chair | Dieryckx.m@daikineurope.com | 0477663625 | Daikin |
| Rajan Rajendran | Rajan.Rajendran@emerson.com | (937) 726-0620 | Emerson |
| Tony Welter | tony.welter@hendersonengineers.com | (913) 742-5484 | Henderson Engineers |
| Georgi Kazachki | kazachki@comcast.net | (678)576-7135 | CRYOTHERM Consulting |
| Shitong Zha | shitongzha@gmail.com | (470) 328-9018 | |
| Adnan Ayub | adnan@iso-therm.com | (817) 472-9922 | Isotherm Inc. |
| | | | |
| | | | |

Refrigeration Technology Bi-Annual Report Subcommittee Meeting Start Time Options based upon home base locations of members:

| Martin | Rajan | Georgi | Shitong | Adnan | Tony |
|---------------|--------------|---------------|----------------|--------------|-------------|
| 2pm | 8am | 8am | 8am | 7am | 7am |
| 3pm | 9am | 9am | 9am | 8am | 8am |
| 4pm | 10am | 10am | 10am | 9am | 9am |
| 5pm | 11am | 11am | 11am | 10am | 10am |

Refrigeration Technology Committee for Comfort, Process, and Cold-Chain (REF-CPCC)

| Refrigeration Representatives to MTG.RAC | | | |
|---|--|---------------------|--------------------|
| Scope: | The MTG will coordinate and oversee the creation of an ASHRAE/UNEP Guide for Refrigeration and Air-Conditioning (RAC) Plant Assessments. The Guide aims to be an international reference for the safe and sustainable operation and maintenance of air-conditioning and refrigeration plants, with special focus on developing markets. The Guide is to form the basis of tools that will verify compliance to recommended practices that can be verified through a point-based qualification or verification scheme. The work will be a cooperative effort with United Nations Environment due to the critical need for such guidance in the developing world with availability of UNEP funding to offset authoring expenses. | | |
| REF Voting Representative | Carlos Alberto Mitroga - cmitroga@danfoss.com - 541147564100 | | |
| SY 19-20 Objectives: | | | |
| Objective #1 | Support the MTG.RAC in the development of Guide for Refrigeration and Air-Conditioning (RAC) Plant Assessments | | |
| Objective #2 | Report back regularly to REF-CPCC on progress made on the guide and solicit assistance from REF-CPCC members as required to help complete the Guide in a timely fashion. | | |
| Alternate Members | | | |
| Name | Email | Phone Number | Affiliation |
| Alt. #1 Walid Chakroun | wchakroun@gmail.com | 96599587712 | Kuwait Univ. |
| Alt. #2 Tony Welter | tony.welter@hei-eng.com | | |
| Alt. #3 Dustin Lilya | dlilya@dcengineering.net | 208-288-2181 | |
| Alt. #4 Stephen Gill | ASHRAE@stephencgill.com | 44 7970 786893 | |

MTG.RAC Voting Representative & Alternates Meeting Start Time Options based upon home base locations of members:

| Carlos | Walid | Stephen | Tony | Dustin |
|---------------|--------------|----------------|-------------|---------------|
| 9am | 4pm | 2pm | 7am | 8am |
| 10am | 5pm | 3pm | 8am | 9am |
| 11am | 6pm | 4pm | 9am | 10am |
| 12pm | 7pm | 5pm | 10am | 11 am |

REFRIGERATION TECHNOLOGY COMMITTEE FOR COMFORT, PROCESS, AND COLD-CHAIN
2019-2020 MBOs
Rajan Rajendran, Chair
Date: 8/6/2019

| MBO # | MBO | Status | Date Due | Assigned To | Applicable initiative # | MBO Comments | Strategic Direction Specific Comments | Fiscal Impact |
|-------|---|------------|--------------|--|-------------------------|--|---------------------------------------|---------------|
| 1 | Reorganize subcommittee structure within REF | <u>New</u> | January 2020 | Rajan R; Yunho Hwang; Bill W | 3 | 1. Program subcommittee; 2. Research subcommittee; 3. HVAC subcommittee; 4. Cold Chain subcommittee; 5. R in ASHRAE Subcommittee; 6. Refrigeration Technology Report Subcommittee | #3a, b, c | None |
| 2 | Appoint a voting Representative and Alternate member to the new MTG.RAC - RAC Plant Assessment Guide | <u>New</u> | January 2020 | Rajan R; Yunho Hwang | 3 | Join the MTG and participate to add value to ASHRAE | #3a, b, c | None |
| 3 | Take ownership of the new "R" in ASHRAE webpage for further implementation and on-going maintenance. Promote the new REF committee organization and name throughout society; put together the plan for a bi-annual report on refrigeration technology (last year's MBO) | <u>New</u> | October 2019 | RAC Chair and Vice Chair Yunho Hwang; Michael Vaughn; Martin D; | 2 & 3 | Establish a subcommittee and work closely with ASHRAE staff to continue highlighting the R in ASHRAE; expand and add new content as relevant; at mid-year, revisit the website and looking for ways to improve; develop a plan and start implementation of the bi-annual Refrigeration Technology report | #2c; #3a, b, c | None |
| 4 | Update REF MOP and Reference Manual and secure TechC approval on update to REF MOP. | <u>New</u> | October 2019 | Rajan R; Michael V | 3 | Have a draft ready for Tech Council approval in Fall 2019 meeting | #3a, b, c | None |
| 5 | Work with partnership organizations to identify and implement collaboration opportunities to promote HVAC&R | <u>New</u> | June 2020 | Dieter C; Ayman E | 1 & 2 | Starting with list of interested parties, IOR, and working with the (to be established) Research subcommittee, identify suggested research topics focused on refrigeration technology and pass on to new RAP for consideration. | #1a, #1b, #2b | None |
| 6 | Better coordinate and communicate REF activities and information transfer to ASHRAE Chapter Refrigeration Committees, possibly in coordination with and support from Section 10 TCs. | <u>New</u> | June 2020 | TBD | #3 & #4 | Prepare short report after each Society meeting that goes to all Chapter Refrigeration Committee Chairs and highlights things such as upcoming Winter meeting Refrigeration program track, upcoming refrigeration conferences, and ASHRAE research in development, underway, or completed related to refrigeration | #3a & #3b | None |
| 7 | Create working group within REF to help develop a proposed 1st draft of work plan between ASHRAE & IIAR for inclusion in new ASHRAE/IIAR MOU prior to the MOU being finalized by ASHRAE and IIAR | <u>New</u> | June 2020 | TBD | #2 | Utilize technical experts within network of REF members and interested ASHRAE members that work for IIAR and serve on SSPCs 15 & 34 to develop a draft work plan prior to the MOU being finalized. | #2b | None |

Goals and Initiatives for 2019-2024 Society Strategic Plan

Initiatives:

- #1 Resilient Building and Communities
- #2 Indoor Environmental Quality
- #3 Organizational Streamlining
- #4 Improve Chapter Engagement, Capacity and support

Goals:

Goal 1: Position ASHRAE as an Essential Knowledge Resource for a Sustainable, High-Performance Built Environment

- #1a Position ASHRAE as an Essential Knowledge Resource for a Sustainable, High-Performance Built Environment
- #1b Expand capabilities globally to create, aggregate and disseminate essential information and knowledge focusing on emerging market trends and transformative approaches

Goal 2: Maximize Member Value and Engagement

- #2a Infuse enthusiasm, vitality and diversity throughout ASHRAE events and services
- #2b Expand the impact of collaboration and partnerships with industry organizations, universities and government agencies
- #2c Leverage technology to increase member engagement, awareness and value

Goal 3: Optimize ASHRAE's Organizational Structure to Maximize Performance

- #3a Prototype and launch new approaches that will increase ASHRAE's relevance and speed to market for key offerings
- #3b Optimize ASHRAE's organizational systems and structures to increase capacity, efficiency and effectiveness
- #3c Cultivate industry and member philanthropy to extend ASHRAE's impact and reach