



American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.

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President's Message

Happy New Year to everyone, I hope that everyone enjoyed the holidays.

I would like to thank last month's chapter meeting presenter. In December the ASHRAE Long Island chapter welcomed Rick Smith from Belimo, who spoke on Smoke Control Strategies, Codes and Standards and Fire and Smoke Dampers and Actuators. The presentation and topic was well attended, received and enlightening.

Now that 2020 is underway, many of us are looking forward to the end of the month many of us will be heading over the 2020 ASHRAE Annual winter Conference/AHR Expo in Orlando Florida. We are looking forward to seeing some familiar faces down at the Conference and Expo booths.

The Long Island chapter has reached the 30% Research Promotion goal for this chapter year and I would like to thank all the generous donors. Thank you to RP Chair Andrew Manos, LEED AP, for his efforts for the 2019-2020 RP campaign.

Keep up with the Long Island Chapter as we will be planning several social events in the upcoming months. Interest in volunteering for the chapter and assisting in any of our committees is always welcome so please reach out to myself or anyone within the chapter if you would like to participate in any way.



Thank you and I look forward to seeing everyone at our next meeting.

Frank Paradiso
President - Long Island Chapter

CHAPTER MONTHLY MEETING

DATE:	Tuesday, January 14, 2020
TIME:	6:00 PM - Cocktails/Dinner 7:00 PM - Dinner Presentation 8:45 PM - Conclusion
LOCATION:	Westbury Manor 1100 Jericho Tpke. Westbury, NY 11590
FEES:	
Members -	\$50.00
Guest -	\$60.00
Student -	\$15.00

Check the ASHRAE Website for Society news and to join/renew membership!

John Frederick Becker Passed on December 29, 2019



The Long Island Chapter is sad to share the news about the passing of a friend and colleague to many of our ASHRAE members, John Frederick Becker, who died suddenly at the age of 55 on December 29, 2019.

John was born on March 8, 1964 and raised in Syosset, New York with his mother, father and brother. There he attended Syosset High School and graduated from New York Institute of Technology in 1988 where he earned a bachelors degree in Mechanical Engineering, following in the footsteps of his father and brother. He also earned his professional Engineering license. In August of 1992, he married his wife, Patrice. They celebrated the birth of their twin daughters, Krista and Paige in 1996.

They first lived in Lindenhurst, NY before moving to Sayville, NY where they spent 15 years being apart of the community. When John wasn't with family and friends, he enjoyed taking long walks with his beloved dog Daisy, skiing, traveling the US and world but specifically visiting his family in Germany.

More than anything, John loved to live life to the fullest with his family and friends. His laughter and light were infectious and will continue to connect us to each other as we hold him in our memories

Long Island Chapter Officers & Committees

ASHRAE 2019/2020 OFFICERS

POSITION	NAME	PHONE	EMAIL
President	Frank Paradiso	631.632.2792	c006@ashrae.net
President-Elect	James Hanna	718.269.3768	c006pe@ashrae.net
Vice President	Bill Artis	516.732.2519	c006vp@ashrae.net
Financial Secretary	Matthew Vitrano	212.643.9055	c006tr@ashrae.net
Treasurer	Murat Bayramoglu	631.312.8818	c006tr@ashrae.net
Secretary	Michael Nigro	212.643.9055	c006sec@ashrae.net
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Board of Governors	Michael Razzano	516.805.3084	c006bog4@ashrae.net
Board of Governors	Richard Halley	516.490.1616	c006bog5@ashrae.net

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COMMITTEE	NAME	PHONE	EMAIL
Programs & Special Events	James Hanna	718.269.3768	c006pe@ashrae.net
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Grassroots Government	Andrew Blom	631.626.1695	c006ggac@ashrae.net
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Historian	Matthew Vitrano	212.643.9055	c006his@ashrae.net
Student Activities (SA)	Elizabeth Jedrlnic	516.490.1621	c006sa@ashrae.net
Young Engineers in	Michael Nigro	212.643.9055	c006yea@ashrae.net
Webmaster	Bill Artis	516.732.2519	c006web@ashrae.net
Nominating	Michael Gerazounis, PE, LEED AP	212.643.9055	nominating@ashraeli.org
Reception & Attendance	Matthew Catan		reception@ashraeli.org
PR & Engineering Joint	Andrew Manos, LEED AP	631.632.2792	pr@ashraeli.org
Golf Outing	Peter Gerazounis, PE LEED AP	212.643.9055	golf@ashraeli.org
Awards	Brian Simkins	203.261.8100	c006ha@ashrae.net

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Chapter Monthly Meeting - Program for 2019/2020

September 10, 2019 * At Westbury Manor  Dinner Presentation – Builds & NYC Code Compliance Presenter: Ian Nelson **1 PDH** Refrigeration Night	March 10, 2020 * At Westbury Manor Dinner Presentation - Natatorium Design Presenter: Joseph Schmitz **1 PDH** Student Activities Night YEA Night
October 8, 2019 * At Westbury Manor  Dinner Presentation— Back to Basics: Hot Gas Bypass and Hot Gas Reheat (and why mixing them up will cost you money) Commissioning for Dummies (by dummies) Presenter: Bill Artis **1 PDH**	April 14, 2020 Dinner Presentation - TBD Presenter: **1 PDH**
November 12, 2019 * At Westbury Manor  Dinner Presentation-- Energy Efficient Solutions for Commercial Kitchen Ventilation Presenter: Dr. Andrey Livchak **1 PDH** Membership Promotion Student Activities Night and YEA Night Resource Promotion Night	May 4, 2020 * Cherry Valley Club, Garden City, NY ANNUAL GOLF OUTING
December 10, 2019 * At Westbury Manor  Dinner Presentation-- Fire & Smoke Damper Actuators Presenters: Rick Smith **1 PDH**	May 12, 2020 Annual Field Trip
January 14, 2020 * At Westbury Manor Dinner Presentation– Grow Rooms– And how to Design them Presenter: Chuck Nora **1 PDH**	June 9, 2020 * At Westbury Manor Free Buffet Dinner for Members PAST PRESIDENTS NIGHT & OFFICER INSTALLATION STUDENT SCHOLARSHIPS TO BE AWARDED ASHRAE History Quiz and prize Give-A-Ways
February 1-5, 2020 ASHRAE Winter Meeting Orlando, FL	June 2020 - TBD (4pm-8pm) * Dixie II @ Captree State Park Boat Basin, NY ANNUAL FISHING TRIP
February 11, 2020 * At Westbury Manor – Dinner Presentation– TBD Presenter: **1 PDH** Membership Promotion Night Resource Promotion Night	August 13-15, 2020 CHAPTERS' REGIONAL CONFERENCE (CRC) REGION I
February 16-22, 2020 NATIONAL ENGINEERS WEEK	

Meeting Program

Dinner Presentation

“Understanding HVAC & Plant Dynamics in Grow Rooms”

Presented by

Chuck Nora
Regional Sales Manager
Desert-Aire, LLC

**Attendees
 Will Earn
 1 PDH!**

DATE:	TUESDAY, JANUARY, 14, 2020		
Time:	6:00 PM - Cocktails and Hors D'oeuvres 7:00 PM - Dinner Presentations 8:45 PM - Conclusion	Fee:	\$ 50.00 Member \$ 60.00 Guest \$ 15.00 Student
Location:	WESTBURY MANOR (516) 333-7117 1100 Jericho Tpke., Westbury, NY 11590 Directions are posted at @ www.ashraeli.com		
Presentation:	This month's presentation will discuss how Indoor Grow rooms are no longer in the basement. This is a Business. From Lighting, Evapotranspiration to Transpiration, we will review how to design and operate indoor grow rooms. All attendees will receive 1 PDH.		
About our Speaker:	Chuck Nora is the Regional Sales Manager for Desert-Aire. His previous experience includes working for V.A. Smith, Brucker Company and Thermosystems. Mr. Nora obtained his BBA in Marketing from the University of Wisconsin. He is a member of the ASHRAE Chicago, IL Chapter.		

CHAPTER MAY NOT ACT FOR SOCIETY

An International Organization

Long Island Chapter - Past Presidents

1958	H. Campbell, Jr. PE	1989	Mel Deimel
1959	Clyde Alston, PE	1990	Robert Rabell
1960	Sidney Walzer, PE	1991	Gerald Berman
1961	Sidney Gayle	1992	Donald Stahl
1962	William Kane	1993	Ronald Kilcarr
1963	Louis Bloom	1994	Jerald Griliches
1964	Milton Maxwell	1995	Walter Stark
1965	Will Reichenback	1996	Joe Marino
1966	Joseph Minton, PE	1997	Norm Maxwell, PE
1967	Irwin Miller	1998	Alan Goerke, PE
1968	Walter Gilroy	1999	Frank Morgigno
1969	Charles Henry	2000	Michael Gerazounis, PE, LEED AP
1970	William Wright	2001	Ray Schmitt
1971	Louis Lenz	2002	Steven M. Stein, PE
1972	Ronald Levine	2003	Andrew Braum, PE
1973	Henry Schulman	2004	Claudio Darras, P.E.
1974	Myron Goldberg	2005	Craig D. Marshall, P.E.
1975	John N. Haarhaus	2006	John Nally
1976	Richard K. Ennis	2007	Peter Gerazounis, PE, LEED AP
1977	Kenneth A. Graff	2008	Steven Friedman, PE, HFDP, LEED AP
1978	Evans Lizardos, PE, LEED AP	2009	Steven Giammona, P.E., LEED AP
1979	Albert Edelstein	2010	Nancy Román
1980	Ralph Butler	2011	Carolyn Arote
1981	Robert Rose, PE	2012	Brian Simkins, LEED AP
1982	Timothy Murphy, PE	2013	Andrew Manos, LEED AP BD+C
1983	Leon Taub, PE	2014	Richard L. Rosner, P.E.
1984	Raymond Combs	2015	Thomas J. Fields, P.E., LEED AP
1985	Edward W. Hoffmann	2016	Donald Kane, P.E.
1986	Jerome T. Norris, PE	2017	Andrew Dubel, P.E., LEED AP
1987	Abe Rubenstein, PE	2018	Richard Halley
1988	Michael O'Rourke		

PAOE POINTS FOR 2019/2020

Chapter Members	Chapter Operations	CTTC	Communi-cations	GGAC	History	Member-ship	Research Promotion	Student Activities	YEA	Chapter PAOE Totals
282	140	50	50	0	355	200	950	350	450	2,545

Student Activities

Students! If you are attending this year's conference please make sure you look into all of the events ASHRAE has set up just for students.

Student Welcome

Saturday, February 1 | 1:00 – 3:00 pm

Hear welcoming remarks from ASHRAE President Darryl K. Boyce followed by presentations by recipients of last year's Grant program and an awards ceremony.

Grant Presentation 1: Closed Loop Hydronic System for Undergraduate Laboratory, University of Regina



YEA/Student Mixer

Saturday, February 1 | 5:00 – 6:30 pm

Mix and mingle with Young Engineers in ASHRAE (YEA) and Technical Committee members. Meet new friends, win prizes in our group poker run activity, and enjoy free food and drinks.

Student Program

Sunday, February 2 | 8:00 am – 1:30 pm

The program will feature technical talks, a career panel Q&A session, plus roundtable discussions over lunch.

Student Tour – Orange County Convention Center (\$15)

Sunday, February 2 | 1:30 – 3:30 pm

Join us for a mini-seminar and facility tour which gives participants a quick look at the massive scale of equipment required to run the Orange County Convention Center, the largest LEED Gold Certified convention center in the world. With over 7.1 million square feet of building space, it takes a lot to keep 1.4 million visitors comfortable during the 200 client events hosted here each year. Join us to see how we make it all work. As a sustainability leader, OCCC has learned much over the past decade.

Student Congress (by invitation only)

Monday, February 3 | 10:00 am – Noon

Student branch officers are selected to participate in this two-hour session to provide ASHRAE leaders with feedback and guidance on student activities.

Student Branch Advisor Congress

Monday, February 3 | 10:00 am – Noon

Student branch advisors are invited to join representatives from the Student Activities Committee to brainstorm ideas for the future.

Elizabeth Jedrlinic

Student Activities Chair

Elizabeth.jedrlinic@trane.com

Research Promotion

I would like to thank the companies who have participated in the annual 2020 Product Directory of Manufacturers and their Representatives. The Product Directory has been prepared as a service to all its members and as a service to the local HVAC industry. It will be made available to all ASHRAE and non-ASHRAE members at no-cost and can be obtained from our monthly meetings or directly from our web-site. There's still time if you would like your company listed in the directory please contact me.



The Directory is intended to provide better communications between manufacturers and their sales representatives; engineers who specify products; contractors who purchase and install the equipment; and other interested parties. Product Directory listings are not limited to ASHRAE members and the listings are not to be considered as advertising or endorsement by ASHRAE of any product, manufacturer or representative.

This year's overall resource promotion goal is \$2,600,000 with over 75 research projects on board. Our chapter is expected to raise approximately \$20,400 towards the overall goal of which we have already raised \$6570. I am hoping I can count on the continued support of all of our past contributors who have generously supported us over the years. I also look forward to gaining the support of new contributors this coming year. Please help support ASHRAE in any way you can.

I would like say 'thank you' to all the contributors listed below whom have already donated to ASHRAE this year:

INDIVIDUALS

Brian Simkins
Peter Gerazounis, PE
Michael Gerazounis, PE
John D Nally
Andrew E Manos
Mordechai Chetrit
Evan Lizardos
Elizabeth Jedrlinic
Frank Paradiso
William Artis
Murat Bayramoglu
Matthew Vitrano
Michael Nigro
James Hanna
Richard Halley

Mike Razzano
Andrew Blom
Matthew Catan
Liset Cordero
Donald Kane, PE

COMPANIES

Catan Equipment Sales
Accuspec, Inc
Gil-Bar Industries, Inc.
KLIMA - NY
Ultimate Power

CONTRIBUTIONS

CAN BE MADE IN THE FOLLOWING WAYS:

1) You can mail your checks, made out to ASHRAE Research Promotion, to:

Andrew Manos, LEED AP BD+C
ASHRAE Research Promotion Chair
c/o Stony Brook University
Campus Planning, Design and Construction
Research and Support Services, Building 17, Suite 160
Development Drive, Stony Brook, NY 11794-6010

2) You can bring your check to any of the meetings and give it to me. I will mail it into headquarters.

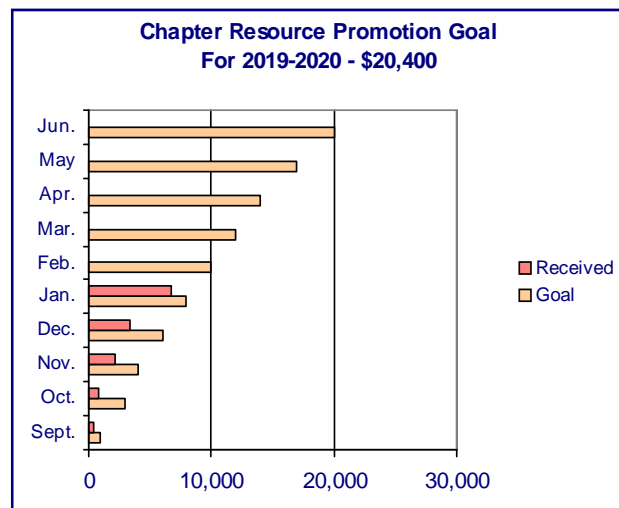
3) You can contribute via PayPal from the ASHRAE LONG ISLAND web site, just click on the donate button.

4) You can contribute directly on-line. www.ashrae.org

*** Please make sure you accredit your contribution to the LONG ISLAND CHAPTER 006 ***

Thank you again for all of your support!

Andrew Manos, LEED AP BD+C - Research Promotion Chair



YEA

Hello everyone and New Year.

I wanted to let everyone know about the following YEA events:

The Spring 2020 YEA Leadership Weekend will be held in Minneapolis, Minnesota from May 15-17, 2020. This event will include segments on understanding your own personality as well as other types, leadership development for young professionals, communication techniques and ASHRAE leadership opportunities. Registration is \$500 and includes hotel accommodations for Friday and Saturday, meals during the event (dinner on Friday, all meals on Saturday, and breakfast and lunch on Sunday), and all necessary materials and resources. Airfare and any ground transportation costs are not included. **Registration will open soon.**



YEA Leadership Weekend 2.0 (YLW 2.0) is designed to provide additional, more advanced resources to YLW alumni. For this continuation of YLW, we bring back Ralph Kison to facilitate and expand on the skills he taught at the existing YLW event. As YLW alumni, you've had the opportunity to use the resources and connections you gained at YLW to not only grow your professional careers, but develop your participation within ASHRAE. The purpose of YLW 2.0 is to continue that growth and development, and hopefully inspire even further leadership skills and aspirations!

As a reminder, YEA Leadership Weekend 2.0 (Palm Springs, CA May 1-3, 2020) registration opens Friday November 15th, 2019. Please reach out to me if you have any questions. YEA Leadership Weekend 1.0 is a prerequisite. Although the deadline has passed, registration spots are still open!

Michael Nigro
YEA Chair



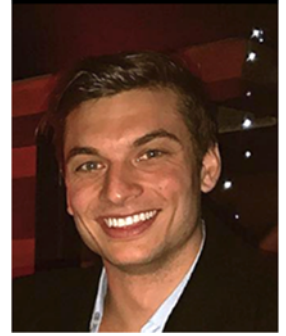
CTTC

Happy New Year! We hope everyone had a very nice holiday and New Year's over the winter break!! We have many exciting activities coming up in 2020 that we will be announcing over the next few weeks!

Joke of the Month: Christmas Presents

An engineer's girlfriend told him she doesn't care what she gets for Christmas as long as it has diamonds in it...

He rushed to the store to buy a pack of playing cards!!!



ASHRAE Certification Review: HFDP – Healthcare Facility Design Professional Certification

Developed with the participation of the American Society for Healthcare Engineering (ASHE) of the American Hospital Association, the HFDP certification validates competency to do the following:

Incorporate standards, guidelines and regulatory codes as well as unique healthcare facility requirements and design principles in HVAC system design.

Chapter Technology Article of the Month: *(Next Pages 11-16)*

Matthew K. Catan
CTTC Chairman

CTTC (Cont'd).

Planning for Failure

End-of-Life Strategies For HVAC Systems

BY GRANT WHEELER, ASSOCIATE MEMBER ASHRAE; MICHAEL DERU, PH.D., MEMBER ASHRAE

The use of mechanical air-conditioning systems is expanding rapidly around the world. An estimated 700 million air conditioners will be operating in the world by 2030.¹ This is great news for the HVAC industry, but this growing demand for air conditioning has enormous environmental and economic impacts. In fact, management of refrigerants was put forth in a recent book as the number one strategy to reduce climate change impact.¹ In the United States, there are several existing and pending regulations for refrigerant management, and the range and complexity of these regulations make it difficult for engineers, contractors, and building owners to keep up with all the requirements, and they introduce confusion and uncertainty in the market.

Most of the economic and environmental burdens from HVAC systems occur during the use phase, but what happens at the end of life can also have a significant impact if not managed properly. When an air-conditioning system fails, owners often want the fastest and lowest first-cost solution. Decisions made at the time of replacement have long-term financial and performance effects, and the quick fix approach can result in an environmental and economic disaster. Owners of HVAC equipment have a tremendous opportunity and responsibility to find optimal solutions with the best economic performance and smallest environmental footprint.

As a means of perspective, the amount of material for residential and commercial central air conditioners and air source heat pumps in the United States is shown in *Figure 1* based on Air-Conditioning, Heating, and Refrigeration Institute 2014 unit shipment data.² The weight distributions are estimated, assuming similar material distributions as a 3 ton (10.5 kW) residential split system and a 20 ton (70 kW) rooftop unit (RTU). These numbers do not account for portable and window air-conditioning units, dehumidifiers, water source heat pumps, or chillers. It should first be noted that the values presented in *Figure 1* are only an estimate meant to provide context when discussing the sheer amount of material required for HVAC equipment. Residential systems alone have several material categories in the hundreds of millions of pounds that are needed for manufacturing annually. Were the roughly 25,400 metric tons of refrigerant to be released to the atmosphere that would be equivalent to 53 million metric tons of carbon dioxide (lb CO₂e) assuming R-410A with a global warming potential (GWP) of 2088.

The impacts of disposing of this material are clearly large, but the potential for reusing and recycling air conditioning systems is also great. *Figure 1* shows that 80% to 88% of air conditioners are recyclable greatly reducing the impact of appliances when best practices are followed. This article looks at the impact of the

Grant Wheeler works in the Building Energy Science Group at the National Renewable Energy Laboratory (NREL), Golden, Colo. Michael Deru, Ph.D., is a senior research engineer in the Building Energy Science Group at NREL and managed the Advanced RTU Campaign for the U.S. Department of Energy.

CTTC (Cont'd.)

TECHNICAL FEATURE

current waste streams for appliances with refrigerants and discusses the regulations and new waste streams that are attempting to reduce the environmental impact.

HVAC Environmental Impacts

Figure 1 identifies the material quantities for residential and commercial units that were sold; however, it is not clear from this chart what ends up in the landfill. Appliances with refrigerant take various paths at the end-of-life including, recycling, reselling, and some are thrown away in U.S. landfills. The U.S. Environmental Protection Agency (EPA) reported that 4.2 million metric tons, or 1.8%, of waste arriving at landfills was because of major appliances, of which 2.4 million metric tons were recycled. This resulted in 1.8 million metric tons of major appliances that ended up in landfills (not recycled) in 2014.³ Major appliances include residential and commercial air conditioners, washers, dryers, dishwashers, water heaters, refrigerators and freezers.⁴ Because the EPA does not split up waste further than major appliances, the sales and shipment numbers^{2,5} for 2014 were used as an approximate percentage of each appliance that was thrown away. These percentages were then used to determine the weight of each appliance in landfills. Various factors such as metal content and local incentives may affect the recycling rate compared to sales and shipment numbers that were used to estimate percentage of waste for different categories of major appliance. Table 1 summarizes the weight of specific appliances put in landfills as well as the possible reduction of material weight in landfills with an increased recycling rate across the United States for 2014. Residential air conditioners include dehumidifiers, mini splits, window units, and split systems up to 5 tons (17.6 kW).

Table 1 illustrates the large amount of waste ending up in landfills. Half a million tons of landfill material were because of residential air conditioners alone. Even though landfills record a 58% recycling rate, more optimized waste streams could increase the recycling rate up to 84% as shown in Figure 1. With an increased recycling rate, an additional 453,600 metric tons of material from major appliances with refrigerant could be recycled.

One factor that the municipal solid waste report does not account for is the emission of refrigerants, which as stated previously has a very large environmental impact. The EPA compiled estimates of refrigerant leakage

FIGURE 1 Estimated material weights of U.S. air-conditioning units for 2014.

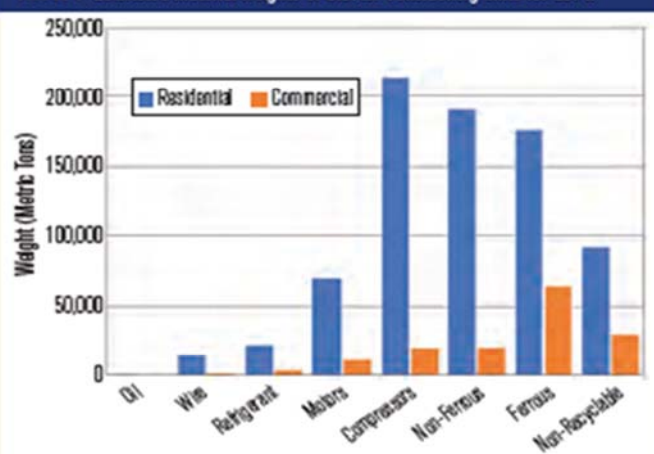


TABLE 1 Major appliances disposed in landfills annually.

DESCRIPTION	PERCENTAGE OF MAJOR APPLIANCES BY WEIGHT	WEIGHT OF LANDFILL APPLIANCES (TONS)	REDUCTION OF LANDFILL WEIGHT WITH IMPROVED RECYCLING RATE (TONS)
Residential Air Conditioners	26.3%	511,100	314,995
Fridges and Freezers	13.7%	265,076	166,368
Commercial Air Conditioners	0.7%	13,962	8,605
Other (No Refrigerant)	59.3%	1,149,861	708,667

rates from appliances and air conditioners as show in Table 2.^{6,7} Were even a small percentage of units ending up in the landfill emitting refrigerants, the impact would be significant. As an example, end-of-life emissions as described in Table 2 would result in release of 3,630 metric tons of the 25,400 metric tons of R-410A from residential and commercial AC systems. This is equivalent to 7.2 million metric tons of CO₂. However, refrigerant impact goes further than the end-of-life stage. Refrigerant loss can happen at any stage of an HVAC system's life.

Most refrigerant losses occur during operation and end of life, but there is a wide variation depending on management and maintenance practices. From an HVAC system owner standpoint, refrigerant loss represents a reduction in performance and a significant financial impact. To reduce operation loss, tighter leak detection and repair methods should be employed. The method for recovering refrigerant at the end of life is also important to ensure that most refrigerant is recovered and either banked for later use or destroyed to ensure that it does not escape to the atmosphere, both

CTTC (Cont'd).

of which can provide an economic benefit to the building owner. The worst-case scenario is when all refrigerant is lost from an HVAC system and the compressor is damaged, effectively ending the life of the HVAC system. Catastrophic failures with complete emission of refrigerant cost the building owner financially for emergency repair of the system as well as the lost opportunity for capturing and reselling or reusing the refrigerant.

A life cycle assessment of air-conditioning systems shows the relative impacts of refrigerant leaks (direct) and energy consumption (indirect) on total greenhouse gas emissions.

An assessment was completed for: (1) standard efficiency units with a 15-year lifetime, (2) conservative estimates for refrigerant emissions from Table 2 and a 1% loss during refrigerant manufacturing,⁸ (3) 2.5 lbs/ton of R-410A, and (5) annual energy consumption of 920 kWh per ton for a residential system and 1,800 kWh per ton for a commercial unit. The environmental impact per ton (capacity) of residential and commercial HVAC systems was estimated for three end-of-life refrigerant recovery loss rates, as shown in Figure 2.

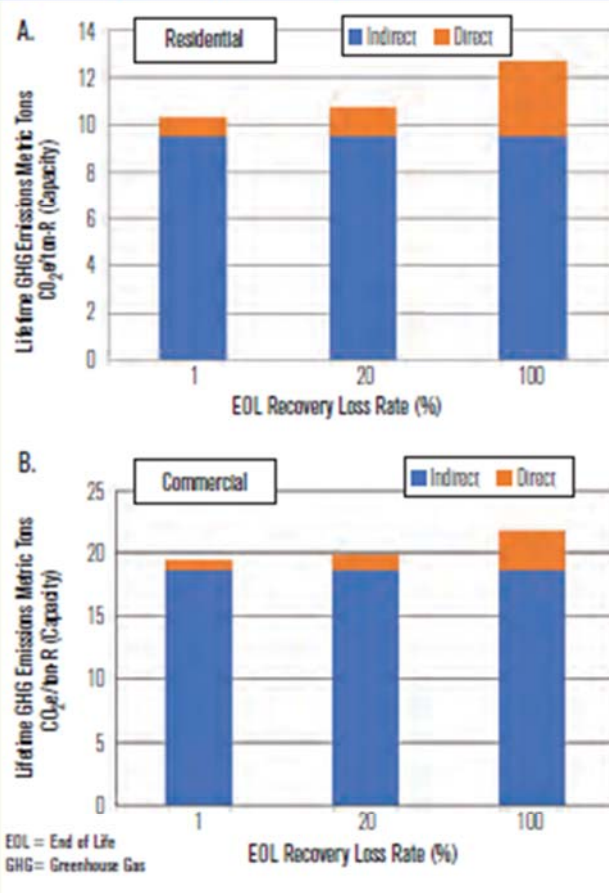
The emissions related to energy consumption during the use phase is the largest impact for this scenario. High-efficiency equipment with optimal controls and proper maintenance would significantly reduce this impact. An important assumption in these calculations is the CO₂e emission factor for electricity. The national average value of 1.52 lb CO₂e/kWh from ASHRAE Standard 105-2014 was used for these calculations.⁹ The impact from energy consumption will obviously reduce with a cleaner grid. For example, California's emission rate of 0.81 is nearly half the national value. If high-efficiency equipment and clean energy sources are used, then the refrigerant management becomes the dominant climate impact, which is why best refrigerant management practices are important.

Waste Streams for Residential and Commercial Equipment

Residential and commercial HVAC systems go through similar steps to enter the recycle streams or end up as

TYPE OF EQUIPMENT	REFRIGERANT WEIGHT	INSTALLATION	OPERATION	REFRIGERANT REMAINING AT END OF LIFE	RECOVERY EFFICIENCY
	Kilogram	Percentage Of Refrigerant	Percentage Of Refrigerant Per Year	Percentage Of Refrigerant	Percentage Of Remaining
Domestic Refrigeration	0.05–0.5	1	0.1–0.5	80	70
Stand-Alone Commercial Applications	0.2–6	3	1–15	80	70
Medium and Large Commercial Refrigeration	50–2,000	3	10–35	100	70
Transport Refrigeration	3–8	1	15–50	50	70
Industrial Refrigeration, Including Food Processing and Cold Storage	10–10,000	3	7–25	100	90
Chillers	10–2,000	1	2–15	100	95
Residential and Commercial Air Conditioning, Including Heat Pumps	0.5–100	1	1–10	80	80
Mobile Air Conditioning	0.5–1.5	0.5	10–20	50	50

FIGURE 2 Life-cycle emissions per ton of cooling for residential and commercial units.



municipal solid waste.

Removal of Equipment. For residential equipment, it is common for equipment to be removed only after

CTTC (Cont'd.)

TECHNICAL FEATURE

failure, which can often include complete refrigerant loss. Unfortunately, from an owner's standpoint, it is difficult to track where the HVAC system goes after removal. Some are destroyed, while others are fixed and sold in the used market. As mentioned in the previous section, a significant number of units end up at the landfill. Noncritical and critical commercial systems will sometimes be involved with a proactive replacement program to reduce emergency maintenance costs and downtime for the business, especially for large companies with thousands of HVAC systems.¹⁰ However, noncritical equipment, that does not affect the commercial business often fails because a catastrophic failure has rendered the equipment beyond repair.

Reclaim of Refrigerant. Residential equipment owners have little control or oversight of the removal of refrigerant. They typically pay an HVAC service technician through a service call or at a landfill/recycling center to handle the refrigerant removal. It is then up to the service technician to reuse or destroy the reclaimed

refrigerant. Commercial applications typically use a service contract to handle the reclaim of refrigerant. Both systems at this point are legally allowed to enter landfills. Unreclaimed refrigerant, or refrigerant lost as a result of a leak, is eventually emitted into the atmosphere.

Separation of Components. The HVAC system can be separated into valuable and nonvaluable resources. This can be done by the HVAC service technician, a third party, or even by landfills. The EPA estimates that 58% of major appliances are recycled at the landfill.³

Best Practices for Retiring HVAC Systems

How to Reduce Environmental Impact, Meet Regulations, and Earn Money

Residential system retirement: The average residential air-conditioner life changes depending on several factors. The ideal system lasts 20 years; however, coastal and humid areas see air-conditioner life spans from 8 to 14 years.¹¹ The average life span of a refrigerator ranges from 7 to 14 years.¹² Homeowners should consider replacement if near the end of the expected life span.



CTTC (Cont'd).

Utility rebates are typically only offered for operable systems (with refrigerant still in the system). There are some recycle centers that offer cash and will pick up systems, and other recycle centers will take appliances for a small fee. HVAC technicians often handle the cost of disposing of air conditioners or refrigerators when new ones are purchased. With any disposal process, it is important to ask what happens with the air conditioner after removal. Reclaim of the refrigerant is required by law; however, recycling the components is not. Best practice is to use a service company or recycling center that manages disposal responsibly.

As mentioned previously, efficiency and proper maintenance are also significant factors for environmental impact. Best practices are to purchase higher-efficiency equipment as electric consumption over the life of an appliance are still the largest impact from a life cycle cost analysis. Higher efficiency units have other advantages as well. According to one study, purchasing a 14 seasonal energy efficiency ratio (SEER) residential air conditioner over a 12 seasonal energy efficiency ratio unit reduces the net CO₂e by 6% over the life span of the unit because of reduced leakage during operation.¹³ Microchannel heat exchangers (sometimes in high-efficiency units) use less refrigerant, which also reduces the life cycle impact of residential units.¹³ However, the biggest impact for higher efficiency systems is still due to reduced energy consumption during typical operation as shown in Figure 1. Maintaining the equipment so it runs at the appropriate efficiency and reduces the chance for refrigerant leakage is also a best practice to reduce environmental impact. Reducing the release of refrigerants throughout the life of air conditioning and refrigeration equipment is covered by ASHRAE Standard 147.¹⁴

Commercial System Retirement. The best practice for managing commercial HVAC systems is to proactively replace them before they fail, which allows time to properly plan and optimize the process and avoids expensive emergency replacements. Most large portfolio owners have a proactive replacement policy; although each is unique, they all have the same basic principles.

- Plan when to remove HVAC systems (usually at 15–20 years).
- Resize (usually downsize) and upgrade the new

FIGURE 3 Comprehensive retirement, recovery, and recycling program.¹⁵



HVAC systems.

- Ensure reuse and recycle of HVAC components.
- One example of a reuse and recycle stream is detailed in Figure 3.

Upon arrival at the reclaim facility, an equipment disposal record is initiated, including the customer's name, location from which the equipment was extracted, manufacturer, and model and serial number. As soon as possible, the refrigerant is removed from each refrigerant circuit, weighed, and recorded by a certified EPA recovery technician using certified EPA recovery equipment. The refrigerant can be banked for future use or sold, both of which can provide a financial benefit to the owner. Next, if applicable, technicians inspect the equipment for reusable parts, remove those parts, and enter them into inventory for the customer's future use. Finally, the unit is disassembled, and parts are sorted and weighed for recycling. Every step of this disposal process is documented, providing proof to the original owner the equipment was disposed of in a regulatory-compliant fashion following sustainable practices. Further pictures of an example site are shown in Figure 4.

Some recycling companies have been able to make the waste stream of HVAC systems cash positive, meaning the building owner receives money for proactively replacing systems. According to one recycling company, "companies that can recycle 50 tons (of cooling capacity) at a time will often find they get paid to recycle as long as the systems contain refrigerant." (Personal interview, March 5, 2018). Bottom line: It benefits building owners to think about their system's end-of-life plan to reduce the burden of replacement. Some pilots are also attempting to provide a net positive cash flow

CTTC (Cont'd.)

for ductless and split systems by grouping together the HVAC systems from several building owners allowing for multifamily and potentially residential participation in using third-party recycling companies.

Regulations

Regulations for management and disposal of HVAC equipment center around reducing the environmental impact of refrigerants through best management practices and through phasedown and phaseout of harmful refrigerants. The environmental impact of refrigerants was first officially recognized with the 1987 Montreal Protocol, and the world phased out the use of chlorofluorocarbons (CFCs) such as R-11 and is now phasing out hydrochlorofluorocarbons (HCFCs) such as R-22 because of their negative impact on the ozone layer. The Kigali Amendment to the Montreal Protocol was finished in 2016 to decrease the impact on climate change by reducing the use of hydrofluorocarbons (HFCs). As of this publication date, the United States has not ratified this agreement.

In the United States, management of refrigerants in stationary cooling equipment is controlled under Section 608 of the Clean Air Act (CAA), which prohibits the knowing release of refrigerant during the maintenance, service, repair, or disposal of air-conditioning and refrigeration equipment.¹⁷ Under Section 608, the EPA established regulations (40 U.S. Code of Federal Regulations [CFR] Part 82, Subparts A and F) that are relevant to the disposal of HVAC and refrigeration equipment. The regulations specify:

- Prevention of the intentional release of refrigerant into the atmosphere;
- Certified recovery equipment;
- Certified recovery technicians;
- Refrigerant disposal regulations for small appliances with refrigerant that enters the waste stream;
- Records from recovery ensuring compliance with regulations; and
- Recovery/destruction procedural requirements for refrigerants.

The EPA developed additional regulations for handling refrigerants to reduce their potential unintentional release to the atmosphere. According to the EPA, these new regulations will remove an estimated 7.3 million metric tons of CO₂e greenhouse gas emissions, which would be equivalent to removing 1.5 million cars from

FIGURE 4 RTUs arrive at the facility, refrigerant is removed, and compressor oil is extracted.¹⁸



the road per year.¹⁸ These regulations are implemented in phases starting in January 2017.

Implemented Jan. 1, 2017. Used HFC, HCFC, and CFC refrigerants must be reclaimed by a certified technician for reuse in a different owner's system.

Implemented Jan. 1, 2018.

- Only certified technicians can purchase or sell HFCs.
- Technicians must be certified for the new regulations to open HFC appliances.
- HFC appliances must be properly evacuated before disposal. Records must be maintained for disposal of appliances with 5–50 lb of HFC refrigerant.

Implemented Jan. 1, 2019. Tighter leak detection, inspection, and repair regulations for units with ≥50 lb of HFC refrigerant, including a specified interval of inspections based on the amount of refrigerant. However, EPA has proposed rolling back these requirements leaving this issue unsettled.

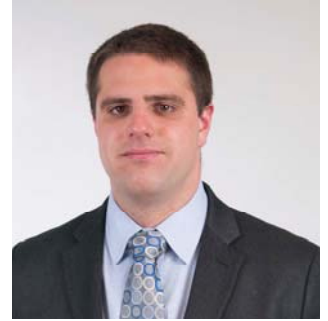
Regulations for the phaseout of HCFC refrigerants is implemented by the EPA under Section 605 of CAA, and acceptable and unacceptable replacement refrigerants are determined by the EPA under Section 612 of CAA through the Significant New Alternatives Policy (SNAP) program.¹⁹ SNAP provides a schedule of the use of acceptable and unacceptable refrigerants. EPA plans to phase down HFCs through SNAP were overturned through a federal court ruling in August 2017 and upheld in Court of Appeals in April 2019; however, several states and industrial companies filed suits for failure to regulate HFCs. Phaseout of HFCs was implemented in Europe with the passage of the F-Gas regulations in 2015. In the absence of the EPA SNAP rules, California developed HFC phase down plans and several other states including New York, Maryland, and Connecticut are working on their own regulations. The uncertainty at the national level and the patch work of state regulations provides a challenging landscape for manufacturers, owners, and contractors.

History

The Strange History of Frozen Food

Clarence Birdseye: Father of Frozen Food

The frozen food industry would be nothing without Clarence Birdseye, the man responsible for Birds Eye frozen foods, which is currently owned by Pinnacle Foods Inc. People have been freezing foods as a means of preservation since as early as 1000 B.C., when the Chinese stored goods in ice cellars. But Birdseye figured out the logistics of selling frozen foods: how could he freeze it fast so it didn't deform the food tissue? How would he package it? How would he transport the product?



As a young engineer in Labrador, an eastern province in Canada, Birdseye often froze his catch after a day of fishing to keep it fresh. He learned this from the Inuit who would fish from holes in the ice and let it freeze instantly in the frigid temperatures, Mark Kurlansky writes in *Birdseye: The Adventures of a Curious Man*. Birdseye noticed that when the fish thawed, it wasn't mushy like other frozen foods he had tried before. This was around 1912.

"When he lived in Labrador, the food he froze for his family was really good — not like the frozen food that was available everywhere," Kurlasky writes. "He realized that because it froze instantly, because it was so cold — that was the key to making frozen food good."

It wasn't until 1927 that Birdseye applied to patent a multiplate freezing machine. According to the *Handbook of Frozen Foods*, Birdseye placed food between two metallic plates at -13 degrees F against a low convection tunnel to flash-freeze the product. In 1928, Birdseye was successful in creating the double belt freezer which would be the forerunner to modern freezing technology. In 1930, the first line of frozen foods went public through the Birds Eye Frosted Food Company which was later sold to Postum, Inc.

The original, flash-frozen foods included haddock fillets, 17 other cuts of meat and fish, as well as fruits and veggies like spinach, loganberries and raspberries. The company advertised June peas "as gloriously green as any you will see next summer."

By World War II, canned goods were sent to soldiers overseas and Americans were encouraged to purchase frozen foods. Frozen also used fewer ration points than canned, according to the National Frozen & Refrigerated Foods Association's (NFRA) website. Post-war, between 1945 and 1946, Americans bought 800 million pounds of frozen food, Kurlansky writes.

Matthew Vitrano
History Chairman

Grassroots Government Activities Committee (GGAC)

Welcome back, I hope everyone enjoyed their holidays and time off. I'm looking forward to seeing everyone at the next meeting. I'd like to remind everyone that we are actively in the process of planning an event for GGAC called a "Day on the Hill". We'd love to have a few volunteers to come by and get involved. If you're interested, please let me know as soon as you can. We're planning this with several regional chapters and I would greatly appreciate any participation. Details are still being ironed out.

This is a portion of Governor Cuomo's 2020 State of the State Address From [NYSER-DA.ny.gov](https://www.nyserda.ny.gov):

Growing New York's Green Economy

Retrofitting Homes and Businesses to Lower Carbon Emissions: In 2020, the State will undertake a multi-part initiative to bend the curve on fossil fuel consumption in buildings. NYSERDA will launch a \$30 million Empire Building Retrofit Challenge to demonstrate scalable and replicable solutions for high-profile commercial and multi-family buildings across the State. The Challenge will solicit proposals from property owners, developers, equipment manufacturers and energy efficiency providers to demonstrate innovative and integrated solutions that can reduce energy consumption and greenhouse gas emissions from commercial and multi-family buildings, and that can be scaled and replicated across the State.

Strengthening New York's Position as the Hub of the U.S. Offshore Wind Industry: In 2020, NYSERDA will issue its second solicitation for offshore wind facilities, which is expected to yield at least an additional 1,000 megawatts of clean power. NYSERDA, DOT and ESD will also initiate a competitive process to award \$200 million in public investments in port infrastructure improvements.

Protecting the Health of Lake George's Waters: The State will provide an additional \$9.4 million in grants to upgrade the Lake George wastewater treatment plant to preserve the water quality and natural beauty of Lake George.

Expanding Renewable Energy Power in New York to Meet Zero Carbon Emissions by 2040

Increasing Solar, Onshore Wind and Storage Capacity by More Than 1,000 Megawatts: NYSERDA will make competitive awards to 21 large-scale solar, wind and energy storage projects across upstate New York, totaling over 1,000 megawatts of renewable capacity and 40 megawatts of energy storage capacity. Taken together, these efforts will spur over \$2.5 billion in private sector investments toward the development, construction and operation of clean energy projects, create over 2,000 short-term and long-term jobs and generate enough renewable electricity annually to power over 350,000 homes. In addition, NYPA will work with state agencies and authorities and its customers to competitively contract for clean energy resources to further accelerate progress towards meeting the State's aggressive renewable energy goals.

Prepare the Electric Grid for New, Renewable Generation: The state will put together a plan for authorizing and building new transmission capacity to bring clean and renewable power to areas that need additional electricity capacity, prioritizing using existing rights of way. The plan will include upgrading the grid with smart new technology that increases the capacity and effectiveness of the system, such as battery storage technology.

Andrew Blom

Grassroots Government Activities Chair



Refrigeration

LUBRICANTS IN REFRIGERANT SYSTEMS (EXCERPT FROM THE ASHRAE HANDBOOK 2018 CHAPTER 12.2) REFRIGERATION LUBRICANT REQUIREMENT

Regardless of size or system application, refrigerant compressors are classified as either positive-displacement or dynamic. Both functions to increase the pressure of the refrigerant vapor. Positive displacement compressors increase refrigerant pressure by reducing the volume of a compression chamber through work applied to the mechanism (scroll, reciprocating, rotary and screw). In contrast, dynamic compressors increase refrigerant pressure continuous pressure of angular momentum from the rotating member. As the gas decelerates, the imparted momentum is converted into a pressure rise. Centrifugal compressors function based on these principals.



Refrigerant compressors require lubricant to do more than simply lubricate bearings and mechanism elements. Oil delivered to mechanism serves as a barrier that separates gas on the discharge side from gas on the suction side. Oil also acts as a coolant, transferring heat from the bearings and mechanism elements to the crankcase sump, which in turn transfers heat to the surroundings. Moreover, oil helps reduce noise generated by moving parts inside the compressor. Generally, the higher the lubricant's viscosity, the better the sealing and noise reduction capabilities.

A hermetic system, in which the motor is exposed to the lubricant, requires a lubricant with electrical insulating properties. Refrigerant gas normally carries some lubricant with it as it flows thorough the condenser, flow control device, and evaporator. The lubricant must return to the compressor in a reasonable time and must have adequate fluidity at low temperatures. It must also be free of suspended matter or components such as wax that might clog the flow control device or deposit in the evaporator and adversely affect heat transfer. In a hermetic system, the lubricant is typically charged only once, so it must function for the compressor's lifetime. The chemical stability required of the lubricant in the presence of refrigerants, metals, motor insulation, and extraneous contaminants is perhaps the most important characteristic distinguishing refrigeration lubricants from those used for all other applications.

Although compression components of centrifugal compressors require no internal lubrication, rotating shaft bearings, seals, and couplings must be adequately lubricated. Turbine and other types of lubricants can be used when the lubricant is not in contact or circulated with the refrigerant.

An ideal lubricant does not exist; a compromise must be made to balance the requirements. A high viscosity lubricant seals gas pressure best and provides maximum protection against wear but may offer more frictional resistance and increase energy consumption by the compressor. Slight foaming can reduce noise, but excessive foaming can carry too much lubricant into the cylinder and can cause structural damage. Lubricants that are more stable chemically are not necessarily good lubricants. Moreover, because refrigerant dilutes the lubricant and travels with it, the lubricant exists in the refrigerant system as a refrigerant/lubricant solution. It also ultimately determines the lubricant's effect on system performance in terms of heat transfer and system efficiencies. In general, the lubricant should be sufficiently miscible with the refrigerant to ensure proper return to the compressor and minimize any negative effect of a separate oil phase on heat exchanger devices in the system, while having limited solubility with the refrigerant to avoid excessive lubricant viscosity reduction in the compressor.

ASHRAE handbooks provide vast amount of information for engineers at all levels. Take a look.

Murat Bayramoglu
Refrigeration Chair

Membership Promotion

In the words of Rainer Maria Rilke, “And now we welcome the new year. Full of things that have never been.” To begin 2020 membership new year’s newsletter, I’d like to wish everyone best wishes for a happy & healthy 2020, as well as continued success in the coming year! Regarding success, our membership continues to grow as an increasing number of HVAC professionals recognize the benefits and value that ASHRAE membership provides. Since we kicked off in September, your Long Island Chapter of ASHRAE has had the privilege of welcoming 11 new members to our family.



Our membership remains our greatest strength, and we look forward to welcoming even more new members in the coming year. Through the year we will continue to offer great programs, learning opportunities and leadership that will help you everyone including our newest members. With the current ASHRAE board and set schedule, we’re ensured to have another success year. These opportunities will provide vital stepping stones to success by way of friendships, education & networking.

With the multiple activities set during this year, a potential idea for everyone is to make ASHRAE one of your new year’s resolutions. Please visit our website at www.ashraeli.org for more information about upcoming events.

I would like to informally welcome our new members this month:

1. James Bishop
2. John S. Moore

Looking forward to another great month and thank you in advance for your support, time & guidance.

Michael Razzano
Membership Promotion Chair

Elizabeth Jedrlinic & Michael Nigro
Membership Promotion Co-Chair

BOG Meeting Minutes

BOG September Meeting Long Island Chapter
September 10, 2019 / 5:00 PM / Location: Westbury Manor

Board of Governors		
President	Frank Paradiso	X
President Elect	James Hanna	X
Vice President	William Artis	
Financial Secretary	Mathew Vitrano	X
Treasurer	Murat Bayramoglu	X
Secretary	Michael Nigro	X
BOG-1	Elizabeth Jedrlinic	X
BOG-2	Andrew Blom	X
BOG-3	Mathew Catan	X
BOG-4	Michael Razzano	X
BOG Immediate President	Richard Halley	X
Committee Member	Matthew Catan	X
Committee Member	Brian Simkins	X
Committee Member	Andy Manos	X

President (Frank Paradiso) Chapter Operations [min-600/Par-1200] Total Points: 80

- Review Minutes. **Quorum Achieved 5:10**
- Newsletter: Newsletter and meeting notice separate.
Please try to have your articles to Liset by Monday December 30th.

Programs (James Hanna)

- Fundraising opportunities for cocktail hour sponsorship
- Suggestions for topics & presenters for the remaining programs open slots (I believe remaining months are spoken for)
- Field Trip: Early thoughts with Membership committee
Sterilization Plant , May 2020
Brewery
Dry-aging Room

Chapter Technology Transfer (Matthew Catan, Murat Bayramoglu) [min-550/par-1050] Total Points: (50)

- Work with James (Programs) for PDH certified presentations
- PDH Sign in sheet and Presentation Survey sheets **Matt to send out PDH credits**

Financial Secretary (Matthew Vitrano)

- Develop Monthly finance report with using actual bank statement with all the credits and debits accounted for.
- Review at BOG meetings - monthly income and spending.

Treasurer (Murat Bayramoglu)

- Account status? **Received Treasurer's financial report**
- 2019-2020 Long Island Chapter Assessment (\$2,688.00) by December 31, 2019. **Paid**
- CRC 2017 profit share still outstanding, review accounting to find paperwork and update amount if incorrect.
Don shared final tally
All hands on deck to seek and fundraise sponsorships for chapter operations
Invoice/update Newsletter Advertisements early in the chapter year (Andy with help from Matthew V. & Michael N.)

Government Affairs (Andrew Blom) [min-500/par-650] Total Points (0)

- Activities:
- Update local Politician list
- Public relations Andy Manos
- Engineer's week – February – Topic: Commissioning**

Historical (Matthew Vitrano) [min-100/par-300] Total Points (355)

- Articles/interviews of past president's Potential life-members/fellows or historical journal articles.
- Boards are going to be updated.

BOG Meeting Minutes

Honors and Awards Chair (Brian Simkins)

- Service awards/Technical Awards
- Candidate Projects
- If there are any projects let Brian know

Research Promotion (Andy Manos, Michael Nigro, Matthew Vitrano) [min-800/par-1050] Total Points (540)

- Vendor Book status.
- 50/50, (other ideas to increase raffle purchases)
- We have achieved full circle, Thank you to everyone for their generous donations.
- RP Goal is \$20,400.
- 30% by December 30th

Refrigeration (Murat Bayramoglu)

- Northrop Grumman visit (Mike R)

Membership Promotion (Michael Razzano, Co-chairs, Elizabeth Jedrlinic, Michael Nigro) [min-500/par-800] Total Points (400) *10 New Members this year*

- Membership Upgrades: 3 new members recognized this month and in newsletter.
- Discussion/suggestions on increasing chapter meeting attendance & Increase chapter membership:.
- Plan additional social events with YEA?
Last month's event at Plattduetsche Park Nov 22nd went well

Student Activities (Elizabeth Jedrlinic) [min-500/par-800] Total Points (350)

- Stony Brook, Suffolk Community College, Hofstra, NYIT and others.
- Discuss which local universities/colleges student chapters are active and which can be re-activated.
Update on Stonybrook student chapter?
- Any ideas for social events that can include students
- Liz to begin working on presentation on STEM

YEA (Michael Nigro) [min-300/par-800] Total Points (450)

- 2019 Collaborate with Membership Promotion and Student Activities for Social events throughout the year in order to interest new chapter involvement, volunteers etc.
- Thoughts on springtime BBQ?
- MBO's for the year?
- Brewery YEA event – Planning for End of February/Beginning of March

Reception & Attendance (Matt Catan, Michael Razzano)

- Crushing it 2.0 :
Actively monitor membership list at reception.

Electronic Communications [min-250/par-650] (50)

- Recovery of old address (Still Ongoing)
Email from Tom Fields, will investigate
- Add Historical Newsletters to website (2018-19 Chapter year)
- E-Communication committee
Webcasting meeting idea for LI chapter (Society hosts go to meeting.)
Looking for volunteers to assist Bill and learn to maintain:
Email service / Weebly website / Linked In

Golf (Peter Gerazounis/Tom Fields)

- May 4th 2020: Cherry Valley Golf event.

New Business...

Next BOG Meeting: 1/14/20 @ 5:00 PM
Location: Westbury Manor

Join ASHRAE on Social Media!



Follow **ASHRAE on Twitter** @ashraenews for up-to-date news, events, and articles about HVAC&R. Search #MyASHRAE on Twitter to see member photos from around the world.

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Most Popular Tweets

Does It Cost More To Build Green? Benefits include reduced operating costs & construction waste.

Online Thermal Comfort Compliance Tool Included In New ASHRAE User's Manual.

87% of households in the US have #AC, 5% do in India. India's tough choice on air-conditioning and climate.



The November issue of the Journal is tested for binding strength to see how many times a page can be turned before the binding would fail.

Harvard & SUNY Upstate Medical University find that workers are healthier and happier in certified green buildings.

ASHRAE Standard 90.1 has been redefining energy savings since 1975. A new version is available now.

Adapting historical buildings for sustainable reuse.

Get To Know ASHRAE



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Certification



Certified

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- Serve as a springboard for continued professional development
- Offer an easy-to-apply process

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If you would like to place an advertisement in the Long Island Sounder, please contact our Chapter Financial Secretary, James Hanna @ 718.269.3768 or by email at finsec@ashraeli.org for further details. Thank you.

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