

NORA Board Meeting
September 22, 2020
12.30 pm

<https://zoom.us/j/173665392?pwd=NDhDb013OUo2elBYMEhUaGkzaDliZz09>

Meeting ID: 173 665 392

Password: 205762

One tap mobile

+13126266799,,173665392# US (Chicago)

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Please Mute Phone or Computer When not Talking

- I. Introduction – Chairman Rick Bologna and President John Huber
- II. Approval of Minutes
- III. Financial Information – Treasurer Eric Degesero
 - a. Management Letter on 2019 Audit
 - b. 2021 State Budgets
 - c. August Financials
- IV. Research and Development – Director of Laboratory Dr. Thomas Butcher
 - a. U.S. -EURO Technical Conference - <https://noraweb.org/the-future-of-liquid-fuels>
 - b. Review of Lab Operations - COVID
 - c. Research Review
- V. Energy Efficiency – Rebates and Evaluation of Effectiveness
- VI. Education and Training Activities John Levey
 - a. Tank Book -<https://secureservercdn.net/184.168.47.225/f54.2d7.myftpupload.com/wp-content/uploads/2020/04/NORA-Advanced-Storage-Tanks.pdf>
 - b. Silver Book
 - c. Revision of Certification Exams
 - d. Gold Program Updates
 - e. Virtual Training
- VII. Executive Committee and Officers
- VIII. Old Business -
- IX. New Business -
- X. Adjournment

Minutes
Board of Directors National Oilheat Research Alliance
May 19, 2020
Noon to 1:30 PM
By Zoom

I. Introduction – Chairman Rick Bologna and President John Huber

II.

Mr. Rick Bologna called the meeting to order at 12:02 pm EST. He noted he was the first person to Chair a NORA Board Meeting on Zoom. He directed Mr. John Huber to call the roll. Mr. Huber called the roll and the following members of the Board were present and a quorum was established.

Scott Vadino
Mario Bouchard
Dave Walton
Mark Casper
Michael Devine
Matt Cota
Kate Duffey
Scott Hacker
Peter Buotte
Ralph Carlo
Sandra Farrell
Matt Meehan
Mike Estes

Susan Hammond
Jeff Lykins
Joe Phillips
Steve Oehlert
Gary Sippin
Randy Groft
Greg Childs
Deanna Sherman
George McQueeney
John McCusker
Rick Bologna
Leann Panebianco

III. Approval of Minutes

A motion to approve the minutes from the September 17, 2019 board meeting was made by Mr. Mike Estes, seconded by Mr. Matt Cota and approved by voice vote.

IV. Financial Information –

Mr. Huber began the Financial Report by noting that NORA suffered a weak first quarter-20% due to 20% warmer weather. The following report is based on audited numbers and should tie to the audit when it is completed. The Lab is still closed by NY State order. Bob O'Brien is classified as an exempt worker so he is able to check in on the Lab every day and keep the current tests running. Mr. Huber concluded his remarks with the good news that all three oil burner manufacturers are working to get high biodiesel blend burners approved by UL and on the market.

Treasurer Eric Degesero presented the following report. I would draw your attention to the Statement of Activities for December 31, 2019. The audit is currently wrapping up,

however, these numbers should be either be the final numbers or very close to them, as all adjustments per the audit have been incorporated.

The first line of interest is line 13, which is shaded red. As you will note, our collections versus budget is nearly \$3 million apart. This large divergence is due to line 15 in olive, 1.7 million of escrow, and the line under it representing refunds. The 2019 budget line is essentially a net number.

So, the correct comparison is the blue line on line 19, essentially, comparing the net number for 2019 with the budgeted number. These two numbers are 85,000 apart. This is largely due to the poor finish in the 4th quarter of 2019.

While collections are down by 85,000, the auditor required us to calculate the actual degree days for the year. As you will recall, our escrow did not cover January 1, 2019 to February 6, 2019. Thus, in a recalculation, the escrow for 2019 will need to be increased by approximately 56,000 as January 1 to February 6, were a smaller part of the overall year's degree days compared to the budget estimate. However, the auditor will give us the exact number.

This shortfall will also have a minor impact on the balance sheet as net assets will have to be reduced to accommodate. John has asked the auditor if a simple reduction in unrestricted net assets can cover this shortfall.

In purple, you will note, a significant increase over the budget. The first number is 5,250 and is revenue from goods sold. Its matching number at the bottom of the sheet is 5,595 and is the cost of goods sold. NORA has outsourced its fulfillment of books, and essentially designed to break even. This difference is essentially the cost of storage at Mimeo, our outside vendor.

The following number, 253,680 are payments from NBB and NYSEDA for support of work being done at the lab, that Dr. Butcher will describe.

The next line of interest is line 35 in light blue. Per the budget, this provides a surplus of \$356,720 to that account. This number is still significant, however, NORA is taking on more square footage in the lab, and the employment is more on track. So, this number should be lower in 2020. However, it is relevant to the balance sheet.

The next item is on line 53 in beige. We are over budget by \$19K. This is largely due to the lab in Plainview.

The next item is legal fees on line 64, NORA's legal fees for its outside counsel are 96K, and are largely allocated to the program areas. In the final audited numbers, these numbers will be adjusted and moved to this line in the audit and the expenses in the program areas will be reduced similarly. Admittedly, this is confusing, but since our budget was adopted, there were changes in accounting standards.

Now turning to the Balance Sheet

In line 18 in magenta, you see the escrow account described previously.

In line 20, in light blue you will see assessments receivable at year end. Essentially, these are funds collected in January that were for the fourth quarter of 2019.

In line 22, we have prepaid assets of 105,183. These are funds where the states accessed 2020 funds for expenditures made in 2019. Generally, these bills were not received until 2020.

Going down in Green is the state rebate obligations. At the end of the year it was down from the previous year. This is good, however, much of that reduction has to do with the escrow account reducing the amount available to states in 2019.

In gray on line 57 are accounts payable. These are bills such as rebates that are due to be paid at year end. Again, many of these reflect expenses incurred in 2019, that were not received until 2020.

Finally, you see a major shift in unrestricted net assets, in brown, going from a negative 447k to a positive 562K. These numbers reflect the net revenue for the year, and this shift as on statement of activities is largely due to the escrow account.

Could someone move the acceptance of the 2019 financials as presented. A motion was made, seconded, and the motion was approved to accept the 2019 financials.

Now I would like to turn to the 2020 budget. On line 12 Column O, (beige) you will see a revised number of \$8,127,762. In early February, the Executive Committee reviewed the budget in light of the very warm January. At that point January and early February were 20 percent warmer than normal. The Executive Committee decided that a reduction of 20 percent for the first quarter was appropriate. However, as a way to cushion the blow to the states and the budget, they directed that 400,000 be released from the research and development account. In this way states with active rebate programs would be able to maintain those and other states working on efficiency strategies with equipment would also be able to avoid the shock. As you see, the state funds available instead of being reduced, actually increased by 200,000, (green).

The light blue on row 13 shows the reduction in education and training. Similarly, the darker blue on line 38 shows a reduction in the efficiency program.

The prediction of 20 percent was borne out by degree days. A sampling of recently collected funds also indicates that this reduction was appropriate.

A motion to approve the Financial Report and the actions of the Executive Committee to reduce the Budget in order to recognize the adverse impact on collections because of the warm winter was made by Mr. Matt Meehan, seconded by Mr. Mike Estes and passed by voice vote.

Now turning to the March Financials. It should be noted that this does not fully reflect collections for the first quarter, as funds are still arriving, and being reconciled with reporting forms.

Line 15 highlighted in blue, refunds creates the first area of interest. Actual refunds paid in March were higher than year to date. This is reflective of the processing of refunds occurring in March for 2019.

Line 22 in yellow reflects other revenue. At this point, we have some contracts outstanding, but no new significant contract for this year.

Line 30 green reflects the expenditures for the central office for education. This is within budget at this time, however, we are working to put more course material on-line, as John Levey will describe later.

Line 34 in peach describes the research and development at central lab. It is pretty much on schedule.

Line 63 Legal expenses are way under budget. John needs to direct the accounting firm to no longer allocate legal fees to program areas.

Line 76, interest. This is way behind budget as interest rates have essentially collapsed. And then line 82 net revenue. Between budget and YTD, there is a big gap. However, if you compare it to YTD 2019, it is in line, particularly when you calculate the escrow of \$2 million.

Finally, turning to the Statement of Financial Position.

On line 20 under assessments, we have \$1,863,896 for receivables. These are in the system and we have forms in hand, they just have not been reconciled. Our accounting firm is working from home, so the movement and forms from NORA to them and around, is just slower than normal.

The only other item of interest is in light blue on line 69. This represents a significant of NORA reserves. Some of those funds had built with the need to maintain the lab without an authorization. This has occurred. Additionally, the expectation was that it would support projects in the field. We did not receive anything noteworthy as described at our last Board meeting. John and Tom have committed to put together a plan for these funds.

That concludes my report.

IV. Research and Development – Director of Laboratory Dr. Thomas Butcher

1. Review of Lab Operations - COVID 19- As Mr. Huber reported the Lab is closed and everyone is working from home. Bob O'Brien is checking in everyday and keeping ongoing tests operating.
2. Research Review:

Technical Development of Ethyl Levulinate with Dead River Company and Biofine

- Planning for first production plant advancing. NORA providing technical support for commercialization activities;
- Seal materials (elastomers) remain an important concern. Silicon, Teflon, Aflas, and Teflon/graphite composites identified.
- Preparing for a technology demonstration event in Maine. Date TBD. NORA will do a live fire demo.
- First customers will likely be larger, commercial users. A fuel pump is needed for this. We have prototype custom Teflon composite lip seals being made.

Fuel-Fired Heat Pump (SMTI)

- Work on integrating Babington burner with SMTI Heat Pump ongoing;
- Target fuel is blend of petroleum/biodiesel/EL;
- Next major step is conversion of all burner elastomers to EL compatible;
- Lip seal being produced under EL/Biofine project will meet the need for

this burner as well.

- *General Note on Babington Burner*– we have the latest prototype in the NORA lab. Significant improvements have been made in packaging and control tuning. Some testing has been done in collaboration with Babington. Currently on hold.

Biodiesel – Legacy Pump Testing

- Purpose – to evaluate expected life of legacy pumps when operating with biodiesel blends at B20 and higher;

- Testing involves controlled cycling of pumps with inspection and on-burner performance tests at 100,000; 200,000; 350,000; and 500,000 cycles. (50 year equivalent);
- Focus on pressure regulator piston seal;
- First round of testing showed rapid fuel degradation;
- In a second round, fuel changed weekly.
- B0, B20, B50 completed;
- A second set of B0 started;
- B100 starting.
- Results so far: Regulator piston no significant difference; Diaphragm seal worn more with bio; All pumps performed perfectly in on-burner tests.

Next Generation Pumps

- Test stand with control and logging system has been built for this;
- First round of tests completed but manufacturer has decided to make some seal changes;
- We are on hold for the new pumps and this is delayed due to Virus situation.

UL and Biodiesel

- Over the past few months there has been a strong level of activity on getting a test procedure to enable B20 burners, under UL 296 to be listed;
- Resolved issues include allowed elastomers and metals and required cloud point for the test fuel.
- This is expected to be completed and approved over the next ~ 6 weeks, enabling manufacturers to move forward with listing;
- Next step is what do we need to do for higher biodiesel blends.

Field Tests – Higher Biodiesel Blends

- 11 homes at Cubby Oil under test with B50. Periodic visits from NORA staff for fuel sampling and inspection of burner head;
- This test will continue through the summer and into next fall;
- Test sites with B100 – 2 at Hart Home Comfort, 1 at TB home;
- Some site concerns with head coking – leading us to normal service and adjustments. Work in progress.

Tank Heater Field Study Presented by Ryan Kerr

- With higher biodiesel blends, going to B100, there is a question about outdoor tanks and cloud point. Not all tanks can be moved indoors and we estimate some 10% of tanks will need another solution.
- Commercial tank heaters are available which may help.
- Goals of this project include evaluation of:
how cold does fuel get in outdoor tanks?
can commercially available heaters be a solution?
- Tests included: Homes with and without installed tank heaters; Tanks in enclosures; Dual tanks with a pump back-and-forth arrangement for special tests. “Rod” heaters in-tank; “Dip tube” heaters; fuel line heaters
- Key Findings and Plans:

- Without a heater the tank internal temperature lags the outdoor temperature by a few hours (only);
 - The nominal 20 watt heaters used here were not effective enough for higher biodiesel blends;
 - In-line heater found most effective;
- Looking into higher power heaters and concepts for insulated enclosures.

Heat Pump Field Study Presented by Neehad Islam

- Field tests of heat pumps integrated with hydronic heating;
- NYSERDA co-sponsored;
- Two years of field measurements completed;
- Report and best practices recommendations in progress.
- Goal is to understand how people are integrating heat pumps and hydronic heating in the field and how we can recommend improvements.
- Six sites across New York State;
- Detailed logging of system temperatures to enable understanding of operation.
- Key Findings:
 - Many homes use the heat pump as a trim heater for a specific space (office, den, bedroom);
 - One home had multiple heat pumps installed to enable complete conversion to electric heat;
 - Control is manual and informal;
 - Under cold conditions, hydronic heating used primarily;
 - When heat pump is used switch over control can be done simply by different thermostat settings;
 - Some sites did use both on cold days; Project report nearing completion.

Conferences and Presentations

- NYSERDA Visit March 11 – detailed discussions on biodiesel as an option for decarbonizing buildings;
- Paper and presentation on tankless coil boiler project. Accepted for ASHRAE Summer Meeting, Converted to a Virtual Meeting. Neehad to present.
- Invited presentation to AOCS Conference. Ryan was planning to present but meeting cancelled. Editor of AOCS Magazine interviewed us for an article on our work.
- Abstract submitted to AIA Conference in September on Decarbonizing Buildings.
- International Oilheat Workshop being planned in collaboration with Eurofuels.

3. U.S. -EURO Technical Conference

Mr. Huber reported that the plan is now to do this International conference as a virtual meeting. We hope to include participants from Europe, Canada, and the US. We hope to do this in conjunction with EEE and the NEFI virtual conferences. The plan is to split the agenda in half (half for each) in three-hour segments and start the sessions at 8 AM for the convenience of the European participants. More details will be forthcoming as they are agreed upon.

4. Biodiesel Service

Dr. Butcher went on to present the report on the NORA survey titled: Impact on Service by Biodiesel Blends in Heating Oil. The report is attached. The results clearly indicate that biodiesel blends do not cause service problems!

V. Education and Training Activities- Mr. John Levey reported the following:

1. Tank Book- The third revision to the NORA Tank book is finished and available on the NORA website. This version is part of the new Gold book and seminar series.
2. Silver Book- The update of the current Silver book is underway.
3. Revision of Certification Exams- New versions are now in use. No longer the same test, some questions are Bronze or Silver only. 75 questions on each test (vs 100 on the old tests). Expanded bank of questions with a "pool". Majority of schools utilize online testing. Increased number of technicians opting for individual online proctored exams due to geography and/or Covid- 19.
4. Gold Program Updates- The education and training team is working to make the Gold program available on-line. The Hydronic course is finished and available on the website. This summer we hope to have the Efficiency, Venting, and Tanks courses available on-line as well. Once they are finished we will begin work on the Steam course.
5. CEUs- Working with manufacturers & reps to add online content. Online Bioheat Facts presentation in development for spring/summer release.

VI. Executive Committee and Officers- Mr. Huber asked for a motion to add Ms. Sandra Farrell and Ms. Leann Panebianco to the Executive Committee. The motion was made by Mr. Matt Cota, seconded by Mr. Scott Vadino and passed by voice vote. Mr. Huber also asked if anyone was interested in serving as First and Second Vice Chairs to please contact him.

VII. Old Business - None

VIII. New Business - None

IX. Adjournment- the meeting was adjourned at 1:30 PM.



July 7, 2020

National Oilheat Research Alliance
Board of Directors
600 Cameron Street, Suite 206
Alexandria, Virginia 22314

Dear Board Members:

In planning and performing our audit of the financial statements of the National Oilheat Research Alliance (the Alliance) as of and for the year ended December 31, 2019, in accordance with auditing standards generally accepted in the United States of America, we considered the Alliance's internal control over financial reporting (internal control) as a basis for designing our audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the Alliance's internal control. Accordingly, we do not express an opinion on the effectiveness of the Alliance's internal control.

Our consideration of internal control was for the limited purpose described in the preceding paragraph and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies and, therefore, material weaknesses or significant deficiencies may exist that were not identified. In addition, because of inherent limitations in internal control, including the possibility of management override of controls, misstatements due to error or fraud may occur and not be detected by such controls. However, as discussed below, we identified certain deficiencies in internal control that we consider to be a material weaknesses and another deficiency that we consider to be a significant deficiency.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies in internal control, such that there is a reasonable possibility that a material misstatement of the Alliance's financial statements will not be prevented, or detected and corrected, on a timely basis. We consider the following deficiencies in the Alliance's internal control to be material weaknesses:

- In 2019, Public Law 115-334 came into effect and established a requirement that a portion of assessments revenue be maintained in escrow and be unavailable for use until 2028. Management made an estimate based on budget and projections of degree days of the amount to put into escrow. The amount was recalculated during the audit process based on actual income and degree days. The total amount for 2019 unavailable until 2028 is a separately designated net asset. There was no accounting for the designated net asset prior to an entry proposed by us and made by management during the audit. We recommend a process be established to calculate the amount unavailable until 2028 based on actual revenue and track this amount in designated net assets.

Management's Response

Management agrees, but would note that the Alliance uses the audit to ensure that its revenues and expenses for the audit year are correct. As a result, the exact amount of funds to be deposited into the escrow account needs to occur simultaneously with the conclusion of the audit.

National Oilheat Research Alliance
Board of Directors
Alexandria, Virginia
July 7, 2020
Page Two

- During our audit, we noted certain expenses that were not allocated and classified consistent with accounting principles generally accepted in the United States of America (GAAP). Some was the result of the two-year budgeting process of the Alliance so that expenses were recorded consistent with budget, which was not consistent with the changes in GAAP implemented in 2018. However, some was due to the combining of different types of expenses into one account each for each program and supporting service. This resulted in material reclassifying journal entries proposed by us and made by management during the audit process to reclassify expenses. It also resulted in a reclassifying journal entry proposed by us and made by management to present net assets designated for national use consistent with actual expenses. We recommend management ensure the new reporting processes in 2020 and going forward classify and record expenses consistent with GAAP.

Management's Response

Management agrees and would note that the 2020 budget is also not developed in line with the revised GAAP standards, but management will make changes to ensure this GAAP conformity.

A significant deficiency is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance. We consider the following deficiency in the Alliance's internal control to be a significant deficiency:

- We noted expenses that were incurred in 2020 were recorded in 2019 thus overstating expenses and accounts payable. We also noted a check written in 2020 was recorded as if it were written in 2019. These were the result of entry errors. This resulted in journal entries proposed by us and made by management during the audit. We recommend a more thorough review process of expense transactions be implemented, especially with respect to year-end cut-off.

Management's Response

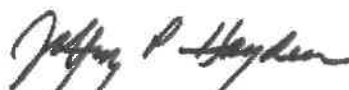
Management agrees with the data entry changes and agrees that a more thorough closing before the audit is appropriate.

The Alliance's written responses to the significant deficiency and material weaknesses identified in our audit have not been subjected to the audit procedures applied in the audit of the financial statements and, accordingly, we express no opinion on them.

This communication is intended solely for the information and use of management, the Board of Directors, and others within the Alliance, and is not intended to be, and should not be, used by anyone other than these specified parties.

Sincerely,

ROSS, LANGAN & MCKENDREE, L.L.P.



Jeffrey P. Hayden, Partner
Certified Public Accountant

Education and Training

| | | | | | |
|----------------------|------|--------|--------|----|--------------|
| | | | | \$ | 1,634,443.00 |
| Connecticut | | 11.03% | | \$ | 180,748.60 |
| District of Columbia | | 0.03% | | \$ | 444.24 |
| Delaware | | 0.49% | | \$ | 7,969.43 |
| Indiana | | 0.13% | 11.68% | \$ | 2,180.41 |
| Kentucky | | 0.99% | | \$ | 16,255.33 |
| Massachusetts | | 11.40% | | \$ | 186,693.24 |
| Maryland | | 2.97% | | \$ | 48,659.20 |
| Maine | | 7.56% | | \$ | 123,869.03 |
| Michigan | | 0.72% | | \$ | 11,727.11 |
| North Carolina | | 3.60% | | \$ | 58,914.03 |
| New Hampshire | | 4.42% | 31.65% | \$ | 72,362.24 |
| New Jersey | | 6.67% | | \$ | 109,290.07 |
| Nevada | | 0.03% | | \$ | 437.69 |
| New York | | 20.11% | 26.81% | \$ | 329,381.97 |
| NYOHA | 0.32 | 6.45% | | \$ | 105,731.61 |
| OHILI | 0.28 | 5.61% | | \$ | 91,897.57 |
| Hudson Valley | 0.15 | 2.98% | | \$ | 48,748.53 |
| UNYEA | 0.25 | 5.07% | | \$ | 83,004.26 |
| Ohio | | 3.19% | | \$ | 52,310.41 |
| Pennsylvania | | 13.24% | | \$ | 216,804.33 |
| Rhode Island | | 3.59% | | \$ | 58,812.31 |
| South Carolina | | 1.41% | | \$ | 23,102.87 |
| Virginia | | 3.11% | 24.54% | \$ | 50,968.08 |
| Vermont | | 2.35% | | \$ | 38,423.04 |
| Washington | | 0.43% | | \$ | 7,057.04 |
| Wisconsin | | 2.54% | 5.32% | \$ | 41,592.99 |

Adjustment for 5 Percent
\$ 3,605.10

Proposed budget was
1638048
so need to adjust
\$ 1,634,442.90

| 2021 | | |
|--------------------------|-------------------|-----------------|
| Research and Development | Energy Efficiency | Rebates |
| \$ 748,048.00 | \$ 899,024.00 | \$ 1,255,129.00 |
| \$ 82,542.53 | \$ 99,201.81 | \$ 138,495.83 |
| \$ 202.87 | \$ 243.82 | \$ 340.39 |
| \$ 3,639.40 | \$ 4,373.93 | \$ 6,106.45 |
| \$ 995.73 | \$ 1,196.69 | \$ 1,670.70 |
| \$ 7,423.33 | \$ 8,921.55 | \$ 12,455.40 |
| \$ 85,257.27 | \$ 102,464.46 | \$ 143,050.82 |
| \$ 22,221.21 | \$ 26,706.05 | \$ 37,284.36 |
| \$ 56,567.31 | \$ 67,984.10 | \$ 94,912.73 |
| \$ 5,355.43 | \$ 6,436.29 | \$ 8,985.72 |
| \$ 26,904.29 | \$ 32,334.30 | \$ 45,141.97 |
| \$ 33,045.69 | \$ 39,715.19 | \$ 55,446.45 |
| \$ 49,909.54 | \$ 59,982.61 | \$ 83,741.83 |
| \$ 199.88 | \$ 240.22 | \$ 335.37 |
| \$ 150,418.99 | \$ 180,777.54 | \$ 252,383.85 |
| \$ 48,284.50 | \$ 58,029.59 | \$ 81,015.22 |
| \$ 41,966.90 | \$ 50,436.93 | \$ 70,415.09 |
| \$ 22,262.01 | \$ 26,755.08 | \$ 37,352.81 |
| \$ 37,905.58 | \$ 45,555.94 | \$ 63,600.73 |
| \$ 23,888.61 | \$ 28,709.97 | \$ 40,082.04 |
| \$ 99,008.12 | \$ 118,990.59 | \$ 166,122.98 |
| \$ 26,857.84 | \$ 32,278.47 | \$ 45,064.03 |
| \$ 10,550.39 | \$ 12,679.74 | \$ 17,702.21 |
| \$ 23,275.61 | \$ 27,973.25 | \$ 39,053.50 |
| \$ 17,546.66 | \$ 21,088.05 | \$ 29,441.06 |
| \$ 3,222.74 | \$ 3,873.18 | \$ 5,407.35 |
| \$ 18,994.29 | \$ 22,827.84 | \$ 31,869.98 |

National Oilheat Research Alliance
Statement of Activities
For the Eight Months Ending August 31, 2020

| | August 2020 | YTD 2020 | 2020 Budget | Remaining | YTD 2019 |
|--|---------------------|-----------------------|---------------------|---------------------|---------------------|
| INCOME | | | | | |
| Collections and Assessments | | | | | |
| Collections | \$158,206.67 | \$5,484,888.15 | \$8,127,762.70 | \$2,642,874.55 | \$5,934,014.16 |
| Remittance Accrual | 0.00 | 0.00 | (2,006,940.68) | (2,006,940.68) | 0.00 |
| Refunds | (65,562.40) | (617,292.93) | 0.00 | 617,292.93 | (568,438.21) |
| Collection Costs | (11,030.11) | (82,837.25) | (90,000.00) | (7,162.75) | (68,107.62) |
| Net Collections | 81,614.16 | 4,784,757.97 | 6,030,822.02 | 1,246,064.05 | 5,297,468.33 |
| In Kind Contributions | | | | | |
| Sales Revenue | 3,148.09 | 6,031.73 | 0.00 | (6,031.73) | 2,429.74 |
| Other Revenue (Grants, etc) | 0.00 | 0.00 | 100,000.00 | 100,000.00 | 451,630.70 |
| Total Income | 84,762.25 | 4,790,789.70 | 6,130,822.02 | 1,340,032.32 | 5,751,528.77 |
| PROGRAM EXPENSES | | | | | |
| Consumer Education and Training (Max. 30%) | | | | | |
| Education and Training (Central) | 20,622.17 | 1,723,133.70 | 1,824,635.61 | 101,501.91 | 1,979,503.22 |
| Education and Training (States) | 0.00 | 1,554,635.61 | 1,554,635.61 | 0.00 | 1,837,333.56 |
| Research Development and Demonstration (Min. 30%) | | | | | |
| Research Development and Demonstration (Central) | 145,103.18 | 1,908,801.98 | 2,278,204.00 | 369,402.02 | 1,447,922.82 |
| Research Development and Demonstration (States) | 0.00 | 1,008,204.00 | 1,008,204.00 | 0.00 | 554,025.67 |
| Home Energy Efficiency Program (Min. 15%) | | | | | |
| Home Energy Efficiency Program (Central) | 7,582.45 | 920,732.35 | 918,123.30 | (2,609.05) | 1,077,752.01 |
| Home Energy Efficiency Program (States) | 0.00 | 858,123.30 | 858,123.30 | 0.00 | 50,741.09 |
| Total Central | 173,307.80 | 1,131,705.12 | 1,600,000.00 | 468,294.88 | 1,086,807.90 |
| Total States | 0.00 | 3,420,962.91 | 3,420,962.91 | 0.00 | 3,418,370.15 |
| State Rebates | 0.00 | 1,202,099.67 | 1,202,099.67 | 0.00 | 1,943,779.14 |
| Old Grant Advertising | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Office Unallocated Expenses | | | | | |
| Salaries and Consulting (Admin) | 7,371.61 | 75,799.31 | 154,994.40 | 79,195.09 | 67,298.91 |
| Accounting (Admin) | 2,905.14 | 51,988.54 | 32,877.60 | (19,110.94) | 22,081.24 |
| Insurance (Admin) | 1,416.97 | 12,300.90 | 14,090.40 | 1,789.50 | 13,064.99 |
| Taxes | 25.37 | 2,550.15 | 2,818.08 | 267.93 | 1,549.63 |
| Postage | 0.00 | 0.00 | 1,409.04 | 1,409.04 | 0.00 |
| Web Pages | 885.11 | 5,000.88 | 14,090.40 | 9,089.52 | 17,050.87 |
| Annual Report | 711.48 | 9,374.31 | 42,271.20 | 32,896.89 | 35,177.11 |
| Rent and Telephone | 0.00 | 11,799.07 | 18,787.20 | 6,988.13 | 12,355.29 |
| Travel | 0.00 | 0.00 | 939.36 | 939.36 | 627.44 |
| Meeting Expenses | 0.00 | 0.00 | 2,818.08 | 2,818.08 | 0.00 |
| Office Supplies | 0.00 | 1,459.36 | 939.36 | (520.00) | 849.48 |
| Dues & Memberships | 13.13 | 140.04 | 939.36 | 799.32 | 139.98 |
| Bank Fees | 306.67 | 989.73 | 5,636.16 | 4,646.43 | 4,172.29 |
| Legal Expense | 1,653.17 | 30,185.36 | 70,452.00 | 40,266.64 | 13,320.59 |
| Professional Fees | 165.00 | 1,320.00 | 0.00 | (1,320.00) | 2,190.50 |
| Misc Expense | 0.00 | 420.00 | 0.00 | (420.00) | 0.00 |
| Advertising Expense | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fixed Assets <\$1,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Equipment Maintenance | 0.00 | 1,150.00 | 4,696.80 | 3,546.80 | 0.00 |
| Bad Debts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total Unallocated Expenses | 15,453.65 | 204,477.65 | 367,759.44 | 163,281.79 | 189,878.32 |
| Other Expenses/(Income) | | | | | |
| Cost of Goods Sold | 2,430.52 | 5,387.13 | 0.00 | (5,387.13) | 4,400.21 |
| Interest Expense | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Interest | (25.36) | (2,664.75) | (60,000.00) | (57,335.25) | (54,562.75) |
| Total Other Expenses/(Income) | 2,405.16 | 2,722.38 | (60,000.00) | (62,722.38) | (50,162.54) |
| Net Revenue/(Expense) | (106,404.36) | (1,171,178.03) | (400,000.00) | 771,178.03 | (837,144.20) |

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National Oilheat Research Alliance
Statement of Financial Position
August 31, 2020

| | 2020 | 2019 |
|---|------------------------|------------------------|
| ASSETS | | |
| CURRENT ASSETS: | | |
| Cash and Cash Equivalents | \$12,223,635.89 | \$12,359,952.02 |
| Bank of America - Escrow account | 1,780,972.99 | 0.00 |
| Accounts Receivable | 42,608.57 | 4,004.00 |
| Assessments and Other Receivables | 45,554.37 | 235,153.14 |
| Security Deposit | 24,514.18 | 24,514.18 |
| Prepaid Assets | 21,951.28 | 51,251.41 |
| Total Current Assets | 14,139,237.28 | 12,674,874.75 |
| PROPERTY AND EQUIPMENT | | |
| Office Furniture and Equipment | 78,836.98 | 78,836.98 |
| Website | 45,450.00 | 45,450.00 |
| Computer Equipment | 3,819.34 | 3,819.34 |
| Less: Accumulated Depreciation | (76,421.52) | (68,288.38) |
| Less: Accumulative Amortization (Web Site) | (45,449.99) | (44,619.99) |
| Total Property and Equipment | 6,234.81 | 15,197.95 |
| TOTAL ASSETS | \$14,145,472.09 | \$12,690,072.70 |
| LIABILITIES AND NET ASSETS | | |
| CURRENT LIABILITIES: | | |
| State Rebate Obligations 2014 | 23,315.94 | 11,385.02 |
| State Rebate Obligations 2015 | 183,867.73 | 174,488.93 |
| State Rebate Obligations 2016 | 265,229.13 | 292,810.78 |
| State Rebate Obligations 2017 | 364,748.67 | 629,008.08 |
| State Rebate Obligations 2018 | 684,582.25 | 1,970,168.55 |
| State Rebate Obligations 2019 | 1,417,423.55 | 3,831,317.63 |
| State Rebate Obligations 2020 | 3,350,311.98 | 0.00 |
| Total Grants Payable | 6,289,479.25 | 6,909,178.99 |
| Accrued Salaries & Benefits | 48,775.15 | 44,634.50 |
| Reserve for BIO Diesel Testing | 764.35 | 764.35 |
| Refunds Reserve | 64,946.85 | 0.00 |
| Accounts Payable | 225,285.09 | 189,075.98 |
| Contracts Payable | 0.00 | 106,020.00 |
| Accrued Expenses | 30,300.51 | 29,229.98 |
| Total Current Liabilities | \$6,659,551.20 | \$7,278,903.80 |
| NET ASSETS: | | |
| Unrestricted Net Assets | (574,556.89) | (890,497.81) |
| Pre-2014 Reauthorization Net Assets | 55,933.05 | 55,933.05 |
| Unavailable for Obligation until 10/01/2028 | 1,780,972.99 | 0.00 |
| National Spending Not Yet Incurred | | |
| Research, Development, and Demonstration - net yet obligated | 5,657,334.18 | 5,793,263.19 |
| Research, Development, and Demonstration - obligated under contract | 242,884.00 | 165,884.00 |
| Heating Oil Efficiency and Upgrade - net yet obligated | 148,628.37 | 147,298.86 |
| Consumer Education, Safety, and Training - net yet obligated | 174,725.19 | 139,287.61 |
| Total Net Assets | 7,485,920.89 | 5,411,168.90 |
| TOTAL LIABILITIES AND NET ASSETS | \$14,145,472.09 | \$12,690,072.70 |

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**AUG
19 & 26
SEPT
2 & 9**

A virtual conference on liquid heating fuels in a carbon-constrained world

Go to:

[Day 1: Policy](#)

[Day 2: Regulatory](#)

[Day 3: Fuels](#)

[Day 4: Appliances](#)

[Presenters](#)

[About Eurofuels & NORA](#)



POLICY DAY 1 AUG 19

Day1 will review the policy actions being taken in the United States and the European Union. How will the goals of decarbonization affect the liquid fuels industry? How will the producers and users of the fuels respond? Additionally, industry visions for both the U.S. and Europe will be reviewed and discussed.



| | | | |
|---|---|------------------|----------------|
| Welcome | John Huber, NORA Dr. Moritz Belling, Eurofuel | 9:00 AM (EDT) | 15.00 (CET) |
| Carbon Intensity: The only policy in the U.S. | John Huber, NORA Michael Trunzo, Shenker, Russo & Clark LLP | 9:10 | 15.10 |
| Twenty-seven countries: The march to low-carbon fuels | Sandrine Devos, Eurofuel | 9:30 | 15.30 |
| Decarbonizing all Fuels: Aviation, road & off-road | Prof. Dr. Christian Küchen, MWV | 9:50 | 15.50 |
| New York: Multi-Dimensional decarbonization planning for residential buildings | Courtney Moriarta, NYSERDA | 10:15 | 16.15 |
| Break | | 10:30 | 16.30 |
| Liquid fuel producers: Makers of today's fuel—what about tomorrow? | Cécile Nourigat, UPEI; Dr. Uta Weiss, UPEI; Giorgia Manno, bp; Eric Slifka, Global Partners; Christian Froehlich & Marc-Manuel Simler, VARO Energy Germany; Sandrine Devos, Eurofuel | 10:40 | 16.40 |
| Eurofuel's Vision & Roadmap | Dr. Moritz Belling, Eurofuel | 11:20 | 17.20 |
| U.S. Heating Oil: What is the strategy? | Charlie Uglietto, Cubby Fuel | 11:40 | 17.40 |
| Wrap-up & Discussion | Dr. Moritz Belling, Eurofuel | 11:50 | 17.50 |

POLICY DAY 1 AUG 19

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Carbon Intensity: The only policy in the U.S.

John Huber, NORA; Michael Trunzo, Shenker, Russo & Clark LLP

John & Michael will provide an overview of U.S. government's activities to achieve a lower carbon economy as well as what effect the November elections could have. Michael will focus on state programs. After the U.S. withdrew from the Paris accords, most of the states in heating oil territory signed onto the Paris accords and enacted aggressive greenhouse gas policies.

Twenty-Seven Countries: The march to low-carbon fuels

Sandrine Devos, Secretary General, Eurofuel Association

Sandrine will describe the activities of the European Union and their goals. She will then describe the complex relationship between the EU in Brussels, and how the goals of the EU are translating to policies in the member states.

Decarbonizing All Fuels: Aviation, road & off-road

Prof. Dr. Christian Küchen, MWV

Decarbonizing fuels is not limited to heating oil. There are aggressive steps throughout Europe to reduce the carbon footprint of all fuels. These fuels include jet fuel and all users of liquid fuels. Such a change would have an impact on each of the users in the liquid fuels sector. Dr. Kuechen will review the steps underway in the EU to reduce carbon emissions from the liquid fuels sector.

New York:

Multi-Dimensional decarbonization planning for residential buildings

Courtney Moriarta, NYSERDA

Ms. Moriarta will provide an overview of New York's Climate Leadership and Community Protection Act (CLCPA) an implementation plan toward a carbon neutral economy. She will then describe what will be necessary to have a successful implementation. How does a transition to electricity affect the need for improved efficiency in buildings, and can that be done cost effectively? Other

than electricity, what role can clean heating fuels play in New York's energy planning scenarios?

Liquid fuel producers:

Makers of today's fuel—what about tomorrow?

Cécile Nourigat, UPEI; Dr. Uta Weiss, UPEI; Giorgia Manno, bp; Eric Slifka, Global Partners; Christian Froehlich, VARO Energy Germany; Marc-Manuel Simler, VARO Energy Germany; Sandrine Devos, Eurofuel

A conversion to low-carbon fuels presents unique challenges and opportunities to traditional manufacturers & distributors. This panel of representatives from integrated oil companies will discuss how they plan to respond to the low carbon challenges. Additionally, Eric Slifka, the CEO of Global Partners will describe how the largest importer and distributor of heating oil in the U.S. is responding

Eurofuel's Vision & road map

Dr. Moritz Belling, Eurofuel

How should the industry respond to the challenges of low carbon fuels? Dr. Moritz Belling will describe the process the industry in Europe undertook to have a response to the growing policy efforts undermining the sale of petroleum products and the results of that process.

U.S. Heating Oil: What is the strategy

Charlie Uglietto, Cubby Fuel

Cubby Fuel retails both residential & commercial heating oil in the Boston market as well as operates an active service department. Cubby began retailing high-blends of biodiesel (B-20) and they are now working to move to B-40. Charlie will present his experiences with higher blends & efforts of the industry to develop a policy to respond to low-carbon demands. At an industry meeting of 200 retailers, a resolution to point a pathway forward was passed and Charlie is leading the way to have it implemented.

REGULATORY

DAY 2

AUG 26

Day 2 will focus on the regulatory framework for oil heating systems and low carbon fuels. The views: *electricity is the solution to everything; how to subsidize conversions to heat pumps; tax schemes to reward or punish energy based on its carbon intensity and incentives for improvements* will be examined.



| | | | |
|--|---|------------------|----------------|
| Welcome | John Huber, NORA Dr. Moritz Bellinghen, Eurofuel | 9:00 AM (EDT) | 15.00 (CET) |
| Biofuels: Can they answer our market? | Paul Nazzaro, Nazzaro Group | 9:10 | 15.10 |
| Boundary Conditions: Restrictions in the EU | Willem Voets, Informazout | 9:30 | 15.30 |
| | Break | 9:50 | 15.50 |
| Biofuels for Heating: Which government policies will make it work | Michael Trunzo, Shenker, Russo & Clark LLP | 10:05 | 16.05 |
| Incentives for Low-carbon Fuels: Taxation and other tools in the EU | Florian Schäfer, IWO | 10:25 | 16.25 |
| Supplying Aviation: Can biofuels do it? | Michael Devine, World Energy | 10:45 | 16.45 |
| Wrap-up & Discussion | John Huber, NORA | 11:00 | 17.00 |

REGULATORY DAY 2 AUG 26

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Biofuels: Can they answer our market

Paul Nazzaro, Nazzaro Group

Paul currently serves as the primary interface between the biofuels industry and the petroleum industry. He has been focused on bringing biodiesel into the heating oil market for nearly 20 years. Paul will highlight the challenges of working with a fuel with slightly different properties. He will address what steps need to be taken to handle biodiesel and the logistical changes that are occurring so it can enter the market.

Boundary Conditions: Restrictions in the EU

Willem Voets, Informazout

Changing from a petroleum system to a system fueled with liquid fuels is not as easy as turning a switch or changing suppliers. There are many regulatory hurdles that must be crossed prior to introducing a new fuel. Willem will describe the regulatory impediments now in place and the steps being taken to overcome them.

Biofuels for Heating: Which government policies will make it work

Michael Trunzo, Shenker, Russo & Clark LLP

During the founding of the United States, the states were described as laboratories where different policies could be tried. As such, that is where

most of the policies for carbon reduction reside. Michael will describe several of those major policies that are either enacted by the states or are under active consideration, and how the industry is responding to them.

Incentives for Low Carbon Fuels: Taxation & Other Tools in the EU

Florian Schäfer, IWO

It is undisputed that low carbon fuels are needed to reach the ambitious climate targets. An important trigger to increase the market share of these fuels is law, which at the moment rather prevents an increased production and usage. Florian will describe the current policy framework on low carbon fuels in the European Union and present Eurofuel's recommendations for adapting the regulatory framework in order to create greater incentives for their production and usage.

Supplying Aviation: Can biofuels do it?

Michael Devine, World Energy

World Energy will describe their efforts to develop from biological feedstocks, a full-slate of products to replace petroleum sourced products. Aviation fuel from bio feedstocks has attracted much attention and World Energy will describe their work on this as well as and some of the other products that they are manufacturing for the ever-changing California market.

FUELS

DAY 3 SEPT 2

Day 3 will see the conference transition to a focus on the technical changes empowering the liquid heating fuels industry to move forward. Discussions of biodiesel (FAME) and renewable diesel (hydrogenated vegetable oil) will examine supply as well as technical issues associated with the fuels. This session will also explore the exotic fuels of the future—liquid fuels made from cellulose and from electrolysis.



| | | | |
|---|---|------------------|----------------|
| Welcome | John Huber, NORA Dr. Moritz Belling, Eurofuel | 9:00 AM (EDT) | 15:00 (CET) |
| Multiple Pathways to a Low-Carbon Future | Dr. Klaus Lucka, Tec4Fuels | 9:10 | 15:10 |
| Biodiesel & Renewable Diesel: Understanding their environmental benefits | Dave Slade, REG | 9:25 | 15:25 |
| Biodiesel: Best answer for the EU? | Angel Alberdi, EWABA | 9:40 | 15:40 |
| Renewable Diesel: Only the carbon score changes | Alexander Stöhr, TOOL-FUEL Services GmbH | 9:55 | 15:55 |
| Break | | 10:10 | 16:10 |
| Cellulosic Fuels: Development is the U.S. | Ryan Rogers, Dead River Co.; Dr. Thomas A. Butcher, NORA | 10:20 | 16:20 |
| From CO ₂ and Renewable Power to Liquid Hydrocarbons | Dr. Tim Böltken, Ineratec | 10:35 | 16:35 |
| Future Fuels: Co-Optima | Bob McCormick, NREL | 10:55 | 16:55 |
| High Biodiesel Blends: Lessons learned, challenges & best practices | Dr. Tom Butcher, NORA | 11:15 | 17:15 |
| Fuel Quality Solutions | Simon Eiden, Tec4Fuels | 11:35 | 17:35 |
| Wrap-up & Discussion | John Huber, NORA | 11:55 | 17:55 |

FUELS

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Multiple Pathways to a Low Carbon Future

Dr. Klaus Lucka, Tec4Fuels

Klaus will describe the efforts at IWO to develop low carbon alternative fuels. There are a number of approaches that could provide the appropriate liquid fuels.

Biodiesel & Renewable Diesel: Understanding Environmental Benefits

Dr. Dave Slade, Renewable Energy Group (REG)

Dave will describe the fuels that REG has developed to serve emerging markets in California and the world. These fuels include renewable diesel and biodiesel, as well as a biodiesel designed to be a heavy oil replacement and a biodiesel that has been further distilled. Dave will also present a study on how biofuels are the most efficient way of reducing atmospheric carbon due to the ability to rapidly introduce them into markets.

Biodiesel: Best Answer for the EU?

Angel Alberdi, EWABA

Angel will discuss the variety of fuels available in the EU. He will evaluate and discuss the biodiesels available from waste oil and their extremely attractive global warming scores and why they provide great value to the EU.

Renewable Diesel: Only the Carbon Score Changes

Alexander Stöhr, TOOL-FUEL Services GmbH

Renewable diesel or hydrogenated vegetable oil has seen a very strong growth curve. Partly this has been driven by the California low carbon fuel standard. However, renewable diesel does not impact NO_x emissions from motor vehicles and can be transported on the pipeline system. For many, it is a direct replacement for petroleum and loved by environmental regulators.

Cellulosic Fuels: Development in the U.S.

Ryan Rogers, Dead River Co.; Dr. Thomas A. Butcher, NORA

The state of Maine is trying to reduce carbon, incentivize heat pumps in a very cold climate. Dead River Co. has been working with NORA to develop and commercialize ethyl levulinate (EL), a liquid fuel made from cellulosic materials. EL has a wide variety

of feedstocks, low pour point and is very stable. Presented will be two field studies on how this product might enter the market.

From CO₂ and Renewable Power to Liquid Hydrocarbons

Dr. Tim Böltken, Ineratec

One of the biggest challenges to move to an electrified economy is that wind and solar are not always generating power when the grid needs it and sometimes they are producing more power than the grid needs. Could that excess electricity be converted to a usable liquid fuel—thus, having a fuel that stores well and is ready for a variety of users throughout Europe. Tim will highlight advances in this technology and how to move it forward.

Future Fuels: Co-Optima

Bob McCormick, National Renewable Energy Lab (NREL)

Fuels and their users have danced a complicated tango since the early days of the automobile. The fights between oil companies and automobile dealers are legend. Bob will discuss the efforts they are undertaking to align next generation fuels with next generation equipment, trying to optimize the benefits of both sides of the equation.

High Biodiesel Blends: Lessons Learned, Challenges & Best Practices

Dr. Tom Butcher, NORA

Dealers in the U. S. have been using biodiesel blends at varying levels for nearly two decades. Tom has been the leading researcher on how those fuels perform in the field and can rebut many of false rumors that have undermined the use of biodiesel. Tom will review the activities and findings of the NORA lab. He will address some common issues with biodiesel and how they are being resolved.

Fuel Quality Solutions

Simon Eiden, Tec4Fuels

The key to all effective heating systems is having a quality fuel in the system. In Germany, fuels are often stored in excess of a year. Simon will describe OWI's efforts to develop and evaluate additives that work effectively with petroleum and biodiesel.

APPLIANCES

DAY 4
SEPT 9

Day 4 will focus on the hardware of heating. What are the potential design and regulatory limits of using low-carbon fuels? What are the world's leading manufacturers doing to ensure that liquid fuel heating equipment will participate in the low-carbon future? Will we see integrated solar heating fuels systems or liquid powered heat pumps? NORA will present a study showing how accelerating the turnover of equipment reduces carbon emissions.



| | | | |
|--|--|------------------|----------------|
| Welcome | John Huber, NORA Dr. Moritz Belling, Eurofuel | 9:00 AM (EDT) | 15.00 (CET) |
| Heating Equipment in the U.S.: Responding & adapting to low-carbon fuels | Mario Bouchard, OMA/Granby Industries; Alan Chmiel, R.W. Beckett Corp.; TBD, Carlin Combustion Technology | 9:10 | 15.10 |
| Big benefits from modernizing home heating equipment | Dr. Tom Butcher, NORA | 9:50 | 15.50 |
| Break | | 10:05 | 16.05 |
| Heating Equipment in Europe: Standards, innovation & replacement cycles | Guido Saenen; Federica Sabati, EHI; Jerome Lamey, Suntec; Dr. Norbert Azuma-Dicke, Viess- mann Group; Raphael Lang, Bosch Buderus; Giuliano Conticini, Ariston Thermo Group | 10:20 | 16.20 |
| EU Field tests | Gunther Köb, EHI | 11:00 | 17.00 |
| Domestic Heating & Hot Water in the U.S.: Changing standards/new developments | Roger Marran, Energy Kinetics | 11:15 | 17.15 |
| Integrating heating Equipment: Solar & liquid fuels working together | Christian Halper, IWO | 11:35 | 17.35 |
| Wrap-up & Discussion | John Huber, NORA Dr. Moritz Belling, Eurofuel | 11:50 | 17.50 |

APPLIANCES

DAY 4
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Heating Equipment in the US:

Responding & Adapting to Low-Carbon Fuels

Mario Bouchard, OMA, Granby Industries; Alan Chmiel, R.W. Beckett Corp.; TBD, Carlin Combustion Technology

Mario will describe the regulatory challenges (UL, ASTM & NFPA) facing equipment manufacturers in the U.S. & Canada and report on Canadian efforts to reduce greenhouse gases and Granby Industries' efforts to meet those

R.W. Beckett Corp. has been developing burners that will meet the industry's needs as well as those of environmental regulators. Alan will describe those efforts and what the expectations are for the future use of the industry.

Carlin Combustion will describe their strategy for the future including working to have a B-20 burner in market and has indicated success with its current line of equipment in burning B-20.

Big Benefits From Modernizing Home Heating Equipment

Dr. Tom Butcher, NORA

NORA has been providing subsidies to encourage the transition of older equipment to be replaced with modern/highly efficient equipment. For many years, NORA has argued that the efficiency labeling used in the U.S. does not capture the actual savings from modernizing equipment. Tom has analyzed the data set from these subsidized conversions and will provide a more accurate view of how much fuel is saved when equipment is replaced.

Heating Equipment in Europe:

Standards, Innovation & Replacement Cycles

Guido Saenen; Federica Sabati, EHI; Jerome Lamey, Suntec;

Dr. Norbert Azuma-Dicke, Viessmann Group; Raphael Lang, Bosch Buderus

A distinguished panel representing leading European manufacturers will describe their activities. The discussion will begin with Guido Saenen and Frederico Sabatti

reviewing the restrictive code bodies in Europe and how they slow the development of equipment. They will also review the current replacement cycle of equipment and what it means to an industry trying to move to the next generation. Jerome Lamey of Suntec will then share what they are doing to have bio-ready equipment in the field, and why they believe this is a good approach for Suntec and the industry. Norbert Azuma-Dicke will then discuss Viessmann group and their next generation equipment, and their view of the changing world. Finally, Bosch Buderus will describe their view of the changing world demand for heating equipment and what they are doing to have that equipment available.

Domestic Heating and Hot Water in the U.S.: Game Changers

Roger Marran, Energy Kinetics

In the U. S., a high percentage of homes heat their domestic hot water with a tankless coil. These have been shown by NORA to be less efficient than indirect water heating. They remain popular because of low-costs and a small footprint. Under a grant from NORA, Energy Kinetics addressed how to make a "tankless coil" efficient while having an acceptable market price.

Proper venting, while not wasting energy up the flue, is a challenge. Energy Kinetics has developed a dilution venting system which avoids condensation and high stack temperatures as a method to improve the efficiency of a standard operating system.

Integrating Heating Equipment:

Solar & Liquid Fuels Working Together

Christian Halper, IWO

The effort to integrate and improve the carbon score of equipment cannot be complete without discussion of solar, the source of all energy. Mr. Halper of IWO will describe their efforts to integrate solar and traditional equipment, thus capturing the free energy of the sun, and lowering the liquid fuel energy requirements of the home.

Presenters (partial list)



Dr. Ernst-Moritz Bellinghen is the President of Eurofuel, the European Heating Oil Association, and the Energy Policy Director at the German Institute for Heating and Oil Technology (IWO). Dr. Bellinghen was born in Hamburg in 1960, where he passed his Abitur. He then studied process engineering in Clausthal-Zellerfeld and obtained a PhD from the Faculty of Mechanical Engineering at the University of Hannover. He worked as a research assistant for the GKSS Research Centre in Geesthacht, where he managed international scientific research projects. He then became a project engineer for Zeppelin Metalworks in Friedrichshafen.

Dr. Bellinghen joined IWO in 1996 and has been its Energy Policy Director since 2014. He has long been involved in Eurofuel as a member of its Board of Directors & the chairman of its Technical Commission. He became its President in 2016.



Mario Bouchard first took over the reins of the family owned heating oil distribution, installation & service business in the late 80's and since has worked for various heating equipment, oil and gas burners, combustion control systems companies such as ICP, Carrier, Riello Burners and Honeywell.

Since 2010, Mario has been working for Granby Industries where he currently occupies the role of Vice President - Business Development, Sales & Marketing for the Canadian and US markets. Granby Industries has been designing, manufacturing and marketing oil tanks & high-efficiency heating products for more than 65 years.

A strong advocate of the oil industry in Canada and the United States, Mario is actively involved in various associations such as the OPTTA, COHA (Canadian Oil Heating Association), the North American Oil Heat Research Alliance (NORA), OMA (Oil Heat Manufacturing Association) and ADEQ (Association of Energy Distributors of Quebec). He has served on the CSA B139 Technical Committee for several years.



Dr. Thomas A. Butcher is Technical Director of the National Oilheat Research Alliance where he leads a group providing the technical support needed to develop a more efficient, renewable future for this industry. Tom has a long history of research work on energy systems, air pollutant emissions, and the use of biofuels in boilers and furnaces. In addition to his work at NORA, Tom is a Group Leader in Energy Conversion at Brookhaven National Lab, an Adjunct Professor at Stony Brook University, and an ASHRAE Fellow.



Giuliano Conticini is Burners Division Vice-President at Ariston Thermo Group, taking full responsibility for any aspect of the burners business.

He holds a Master Degree in Mechanical Engineering, from the University of Pisa.

Since 1978 Giuliano worked in BtoB as well as in durable consumer goods.

He spent his career in major companies in the mechanical sector, starting from Nuovo Pignone, then General Electric, where he gained significant operations and product development experience which brought him to cover senior management positions as Oil&Gas Distribution General Manager and Group Production General Manager.

He has more than 18 years experience in the Heating Industry. Prior to joining Ariston Thermo Group, he held different management roles at Riello, up to Burners Division General Manager and Group Executive General Manager.



Michael Devine is the Vice President of Sales & Business Development for World Energy and specializes in creating new market sales and distribution opportunities, bringing practical business solutions to both the petroleum and biodiesel marketplaces.

An early adopter and outspoken advocate of biodiesel integration, Michael has been a seminal figure in our national renewable fuels initiative. He has been a featured national speaker on the subject of biodiesel integration into the US petroleum supply chain and has also worked hand and hand with national and state petroleum associations to develop successful biodiesel education and policy programs.



Sandrine Devos is Secretary General of Eurofuel (the European Heating Oil Association), which represents organisations that promote the use of heating oil and liquid fuels for domestic heating in Europe. Eurofuel is engaged in the promotion of existing and innovative techniques for liquid fuels for heating and equipment, in the domestic market.

A French national, Sandrine studied political sciences and European Affairs in France, Sweden and UK, and worked in Ireland. She has had over 10 years of EU public affairs experience gained in the Brussels arena within UEPG, the European Aggregates Association (construction sector) and within EBI, the European Boating Industry. Familiar with the functioning and challenges of European industry representation, she has a solid network with the EU institutions and a sound understanding of environment-related issues.

Presenters (partial list)



John Huber is the President of the National Oilheat Research Alliance. He has been President since its inception in 2001 and takes overall responsibility for the research and development, education, and all activities that occur within NORA. During his tenure there, he has led the successful reauthorization efforts for NORA in 2005, 2014 and 2019. Under his leadership, the central lab for research and development was developed in New York, and a complete restructuring of education in the industry occurred.

Prior to joining NORA, John was a federal lobbyist at the Petroleum Marketers Association of America, a trucking association and a maritime association. John received his law degree from Hastings College of the Law, and his undergraduate degree from the University of Washington.



Raphael Lang is the head of the engineering department responsible for development of floor of floor standing heating appliances at Bosch Thermotechnik. In 2004, he started in the automotive area at Bosch Engineering GmbH as engineer for calibration and set up of petrol engines. In 2010, he moved to the test field of Bosch Thermotechnik in Lollar becoming team leader for oil applications and became responsible for endurance testing and technical risk analysis in 2014. Raphael studied mechanical engineering at the University of Applied Sciences Gießen-Friedberg.



Jérôme Lamey started to work for the heating industry seven years ago as sales engineer and now Sales & Marketing Director for Suntec Industries.

Suntec Industries promotes high performances and reliable gear pumps for standard and carbon neutral liquid heating fuels.



Giorgia Manno works for bp as Senior Advisor for EU Government Affairs. She has been working in the oil and gas sector for more than ten years, first for Eni (2009-2017), then for FuelsEurope - the Association of EU refiners (2017-2019) and since January 2020 for bp. She has a solid experience in the EU framework, with a focus on energy, business and geopolitics. Particularly involved in the analysis of the EU Green Deal, the

sustainable finance package and the legislation related to low carbon technologies to demonstrate the sector's commitment towards greenhouse gas emissions reductions and the EU's climate goals. She lives in Brussels and speaks six languages.



Dr. Robert L. McCormick is a Senior Research Fellow in the Fuels & Combustion Science group at the National Renewable Energy Laboratory (NREL). This group's research is focused on biofuels properties and fuel-engine interactions including biofuel quality & quality specifications, compatibility with modern engines, combustion, pollutant emissions effects, and leveraging fuel properties for design of more efficient engines. He has a PhD in chemical engineering. Before joining the NREL in 2001, he was a research professor at the Colorado School of Mines. He has coauthored over 125 peer reviewed technical articles and is a Fellow of SAE International.



Courtney Moriarta is NYSERDA's Single Family Market-Rate Residential Director. Ms. Moriarta is leading NYSERDA's building decarbonization efforts in the single family residential sector. She has over 25 years experience working with contractors, builders, utilities, and government to promote and implement energy efficiency and sustainable building solutions. Prior to her work at NYSERDA, she was a consultant for both the state of Massachusetts and the U.S. Department of Energy's Residential Buildings Integration Group in the Office of Energy Efficiency and Renewable Energy supporting their residential energy programs.



Paul J. Nazzaro presides over The Nazzaro Group which has committed the past twenty-five years focusing on the successful commercialization of biodiesel throughout the U.S. He has been instrumental in establishing the foundation for the heating oil industries transition to Bioheat® and has developed training and communication programs designed to educate the supply chain about the advantages of low carbon liquid fuels coast to coast. He also established Advanced Fuel Solutions which has become a highly recognized and regarded fuel quality management organization serving New England and Mid-Atlantic fuel terminals, wholesalers, distributors and fleets. Before starting AFS Paul amassed valuable business skills working himself through multiple levels of the supply chain with Northeast Petroleum, Whaleco, Coastal Oil New England and Global Companies.

Presenters (partial list)



Ryan Rogers began his career in mechanical construction. Since 2015, he has been a general manager for Dead River Company. In that role he has managed retail fuel operations in central and northern Aroostook County Maine. Ryan was the lead employee for the joint NORA Biofine tests of ethyl levulinate, and has worked diligently to overcome operational issues in having this fuel operate in heating oil equipment.



Florian Schäfer is a Political Advisor at Institut für Wärme und Oeltechnik (IWO). IWO is an institution of the German mineral oil industry and a member of Eurofuel.

Florian studied political science, economics & business law in Düsseldorf, Hamburg and Los Angeles. He joined IWO in 2016 where he works on political and legal issues and focuses especially on the regulatory framework needed to increase the market share of low carbon fuels.



Eric Slifka was appointed President and Chief Executive Officer of Global Partners LP in March 2005 and was also named to the Board of Directors of the Partnership's general partner. Global is a Fortune 500 company with 2019 sales of more than \$13 billion, operating income of nearly \$140 million and a diverse base of energy customers across the United States. Slifka has been in the energy industry since 1987. Before becoming Global's president and CEO, he served predecessor organizations in leadership roles, as well as in senior positions in the accounting, supply, distribution and marketing departments. He is a member of the National Petroleum Council and serves on the board of directors of the Energy Policy Research Foundation, Inc. Global owns, controls or has access to one of the largest terminal networks in New England and New York., through which it distributes gasoline, distillates, residual oil and renewable fuels to wholesalers, retailers and commercial customers. In addition, Global engages in the transportation of petroleum products and renewable fuels by rail from the mid-continental U.S. and Canada.



Michael Trunzo is Director of Government Affairs at the firm of Shenker Russo and Clark, LLP, in Albany, NY, and President of Northeast Public Affairs in Lake Placid, NY. Prior to this his current roles, Mr. Trunzo was President and CEO of the New England Fuel Institute (NEFI) and the NEFI Education Foundation. He currently serves on the Executive Committee of the American Energy Coalition and is a member of the Oilheat Manufacturers Association.

Mr. Trunzo's career has spanned government, politics and trade associations. Mr. Trunzo was also Vice Chancellor for Government Relations at the State University of New York, CEO of the Empire State Petroleum Association, and held several posts in New York State government, including Chief of Staff to the New York State Lieutenant Governor and Chief of Staff to a State Senator. Mr. Trunzo holds a Master's Degree in Public Administration and a Bachelor's Degree in Political Science from Long Island University, CW Post Center, Greenvale, NY.



Willem Voets has been General Manager of Informazout and Cedicol since 2015. Prior to joining Informazout, Willem held various management positions in multinational companies in the field of building construction. He has a background as an industrial engineer, and a postgraduate in administration & business management.

Informazout is above all the information center which consumers and professionals can contact for all questions relating to oil heating. The main focus is on sustainable and efficient heating as well as on the combination with renewable energies.

Cedicol is the knowledge center in heating techniques for different energies.

For the first time ever, the **National Oilheat Research Alliance** (NORA) and **Eurofuel** will host a virtual conference on liquid heating fuels in a carbon constrained world. Manufacturers of heating equipment, liquid fuels now in the market and potential fuels of the future will share their ideas and what steps they are taking to be ready for this future.



The European Heating Oil Association (Eurofuel) represents organizations that promote the use of heating oil and liquid fuels for domestic heating in Europe. Our membership covers 10 European countries, including over 10,000 companies. Eurofuel is engaged in the promotion of existing and innovative techniques for liquid fuels for heating and equipment in the domestic market. Its members are committed to ensuring the competitiveness & efficiency of heating with oil and liquid fuels, while also reducing its environmental footprint.

Find out more at Eurofuel.eu and follow us on Twitter ([@EUROFUELenergy](https://twitter.com/EUROFUELenergy))



NORA was authorized by Congress in 2000 to generate funding, from within the industry, allowing the Oilheating industry to provide more efficient and more reliable heat and hot water to American consumers. NORA's efforts focus on Energy Efficiency, Environmental Responsibility, Safety, Research & Development and Professional Education, with particular emphasis on transitioning heating oil and its appliances to a low-carbon source of heat and hot water.

Find out more at NORAweb.org or contact NORA at info@NORAweb.org



NORA RESEARCH

NORA Board of Directors Meeting
Sept. 22, 2020

1. Legacy Pump Testing B0 to B100 – Neehad Islam
2. New Tests on Solutions to Cold Flow Issues at High Blend Levels – Ryan Kerr
3. NORA Rebate Program – Documenting Energy Savings – Tom Butcher

Legacy Pump Testing B0 to B100

- Goal – evaluate durability and failure modes of legacy oil burner pumps when using biodiesel blends ranging from B0 to B100;
- Focus planned on pressure regulator piston seal but included whole pump;
- “Exposure” based on number of cycles with target of 500,000 cycles (equivalent to 50 years in the field).



Pump Testing – Experimental Details

- Tests done at the NORA Lab in Plainview, N.Y.;
- 8 pumps with each fuel blend in parallel, two arrays, so 16 pumps, two blends at a time;
- Controlled cycling 5 seconds on/5 seconds off;
- Fuel changed weekly and quality parameters measured. Prior experience that this kind of “abuse” can lead to accelerated fuel degradation. One 5-gallon supply for a bank of 8 pumps.
- System includes a nozzle with the discharge below fluid level to minimize air exposure and potential for oxidative degradation of the fuel;
- Copper in the system minimized;
- “B0”, B20, B50, and B100;
- Total test time with each blend ~ 3 months (run time plus test/inspection).

Measuring Impact on Pumps

- Observation of any “seized” pumps or shaft seal failures;
- Planned stops at 100K, 200K, 350K, and 500K cycles;
- Shaft seal and pressure regulator piston face examined for all pumps;
- Diaphragm valve inspected for some cases;
- Full tear-down for inspection at 500,000 cycles all pumps;
- Cutoff test for all pumps at each stop point
 - Installation on a burner;
 - Detailed measurement of cut-off time based on cad cell transient.



Example Results – worst case, 500K cycles, piston face

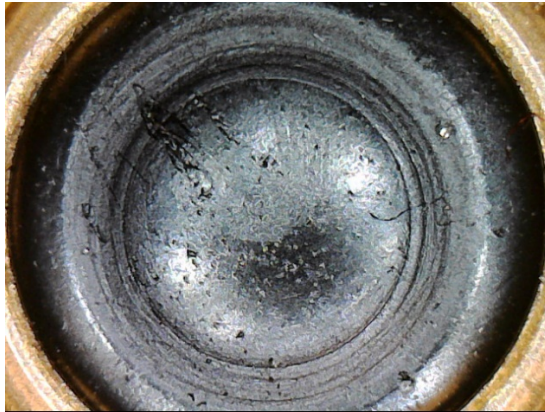
B5



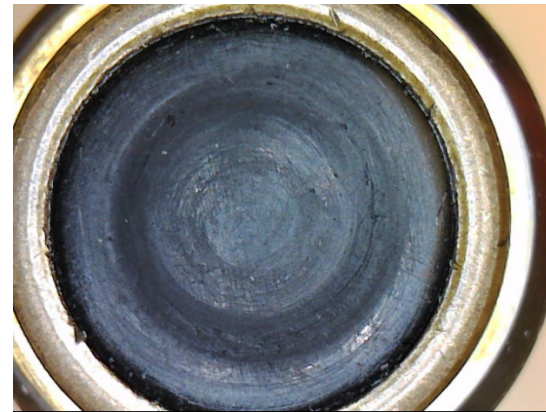
B100



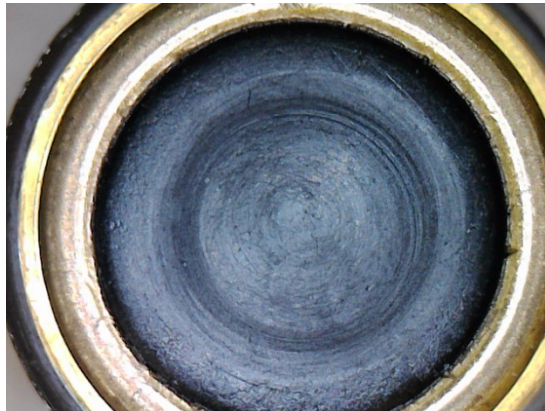
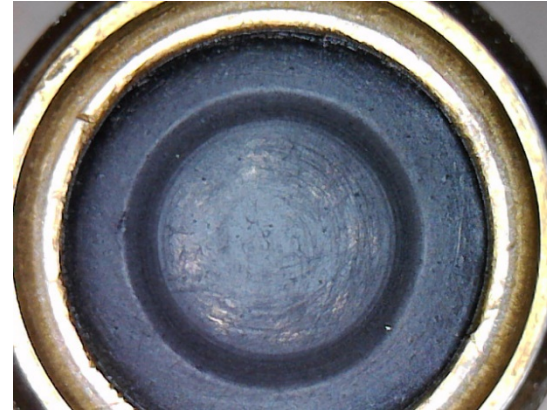
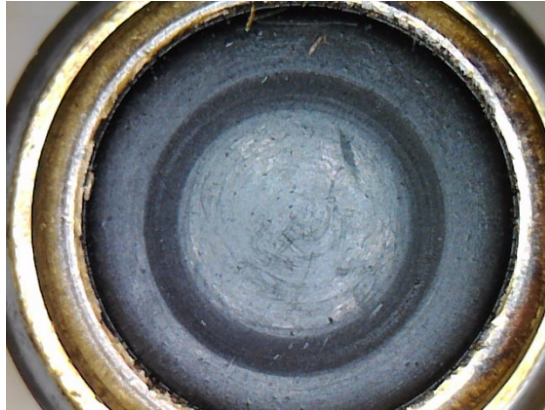
B20



B50

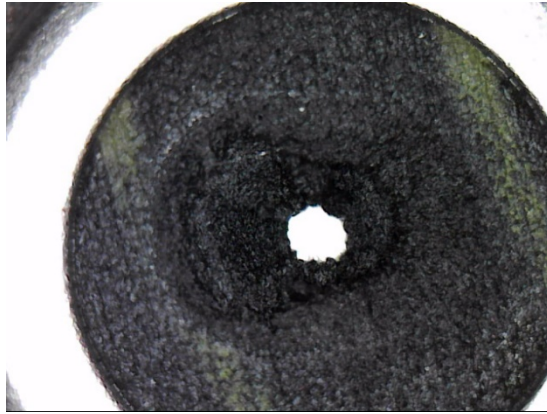


Four other pumps, 500K, B100

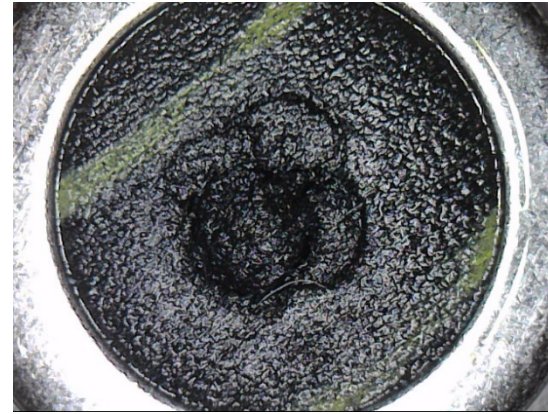


Example Results – worst case, 500K cycles, diaphragm valve

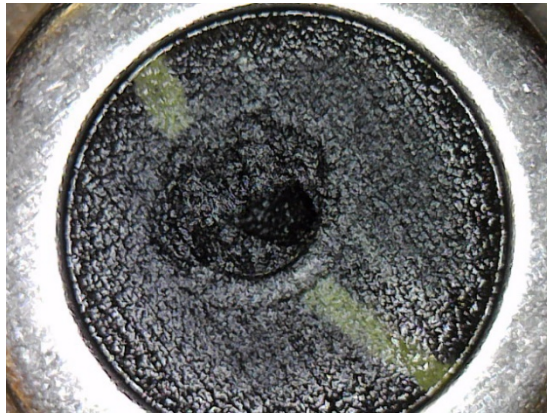
B5



B50



B20



B100



Performance – average cutoff times (sec)

| Fuel↓ - Cycles→ | Average Cutoff Times | | | |
|-----------------|----------------------|---------|---------|---------|
| | 100,000 | 200,000 | 350,000 | 500,000 |
| B5 | 0.3 | 0.28 | 0.34 | 0.23 |
| B20 | 0.26 | 0.21 | 0.28 | 0.31 |
| B50 | 0.28 | 0.21 | 0.23 | 0.19 |
| B100 | 0.31 | 0.34 | 0.28 | 0.3 |

Conclusions and Next Steps

- No difference in observed pump wear over 500K cycles between the fuels tested;
- No pump failures;
- All pumps performed as expected in cutoff tests at all test points;
- A report on this work has been prepared;
- Cycling tests are continuing with other common pumps, nearing completion.

Solutions to Cold Flow Issues at High Blend Levels

- The cloud point of B100 will be 30°F or higher;
- ~ 10% of the tanks are outdoors;
- Many cannot practically be moved inside;
- Segregating deliveries not considered practical;
- Alternative solutions needed.



Outside Tank Tests 2019-2020

- Tests done last year to explore tank internal temperatures (how cold does it really get?) and the use of common commercial tank heater products (~ 20 watts);
- Included both tanks at homes and two “test” tanks setup with different arrangements of pumping;
- Results showed tanks quickly get to ambient outdoor temperatures.
- Common tank heater products not strong enough to solve the B100 concern.



Next Steps Planned after 2019/2020 Winter

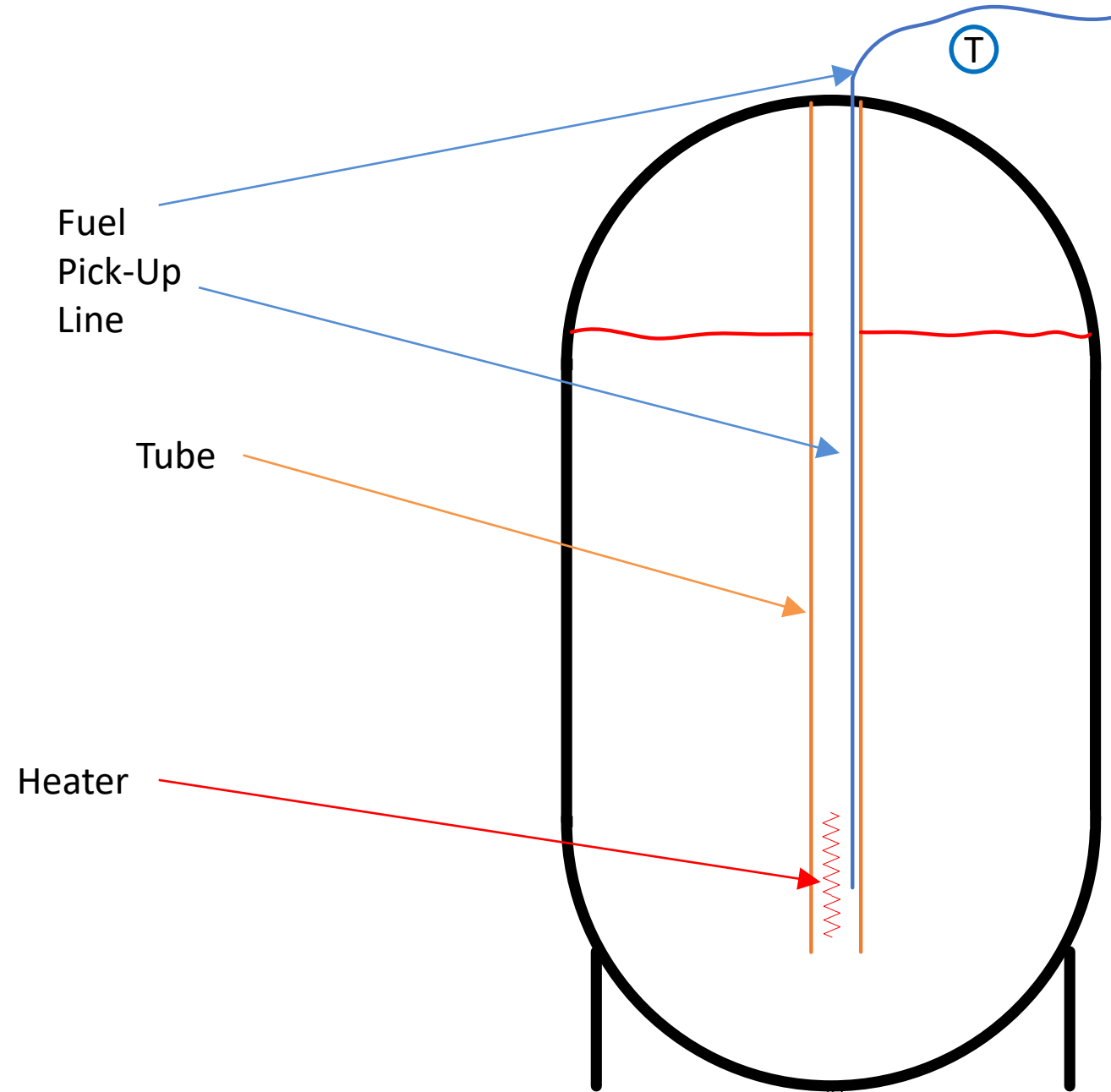
- Higher strength tank heater prototypes developed for us by Rollie Systems;
- Explore insulated enclosures for outside tanks as an option;
- Install a cold chamber outside of the NORA lab in Plainview to allow testing independent of weather.

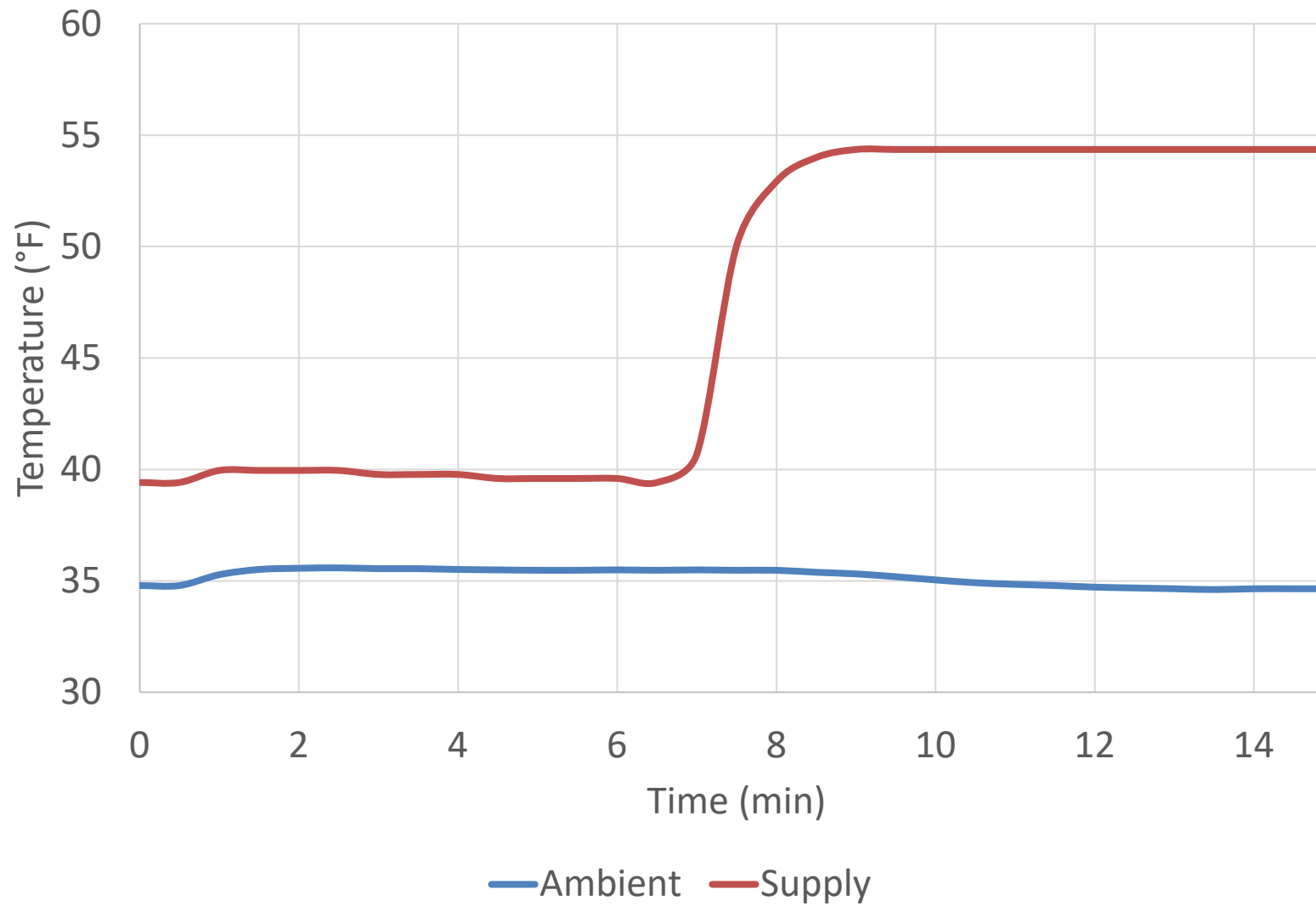


Slide: 13



First Test in Cold Chamber



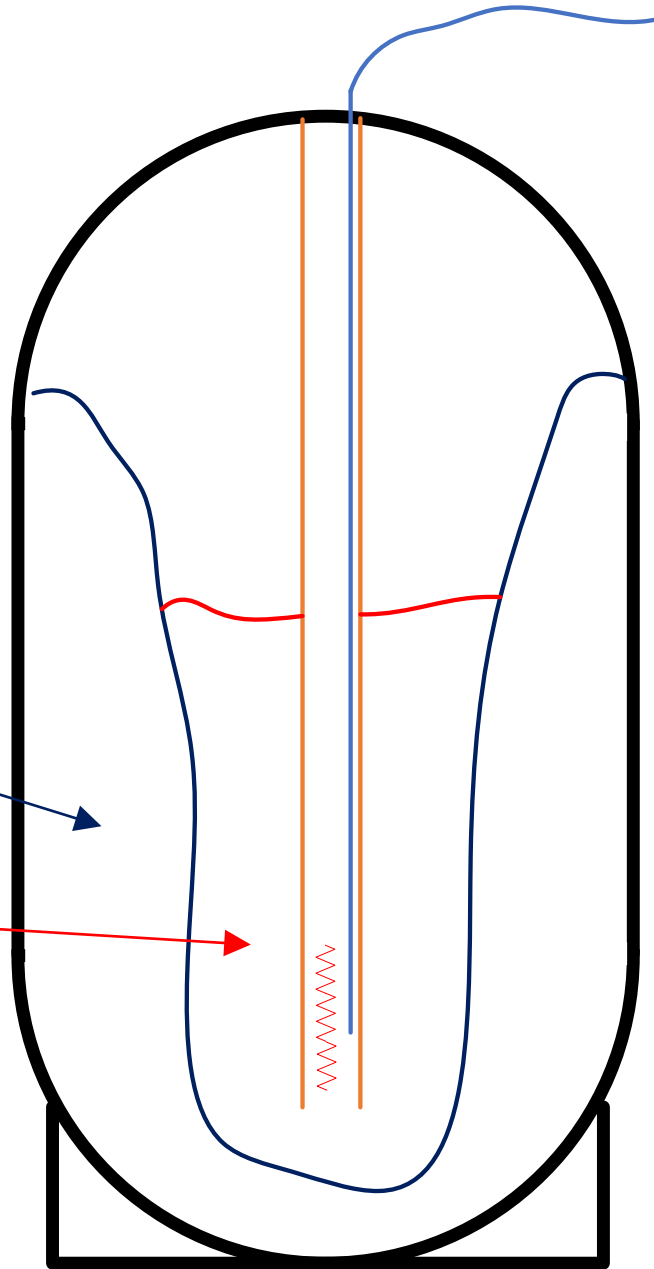


Testing with fuel that is cold but above the pour point.

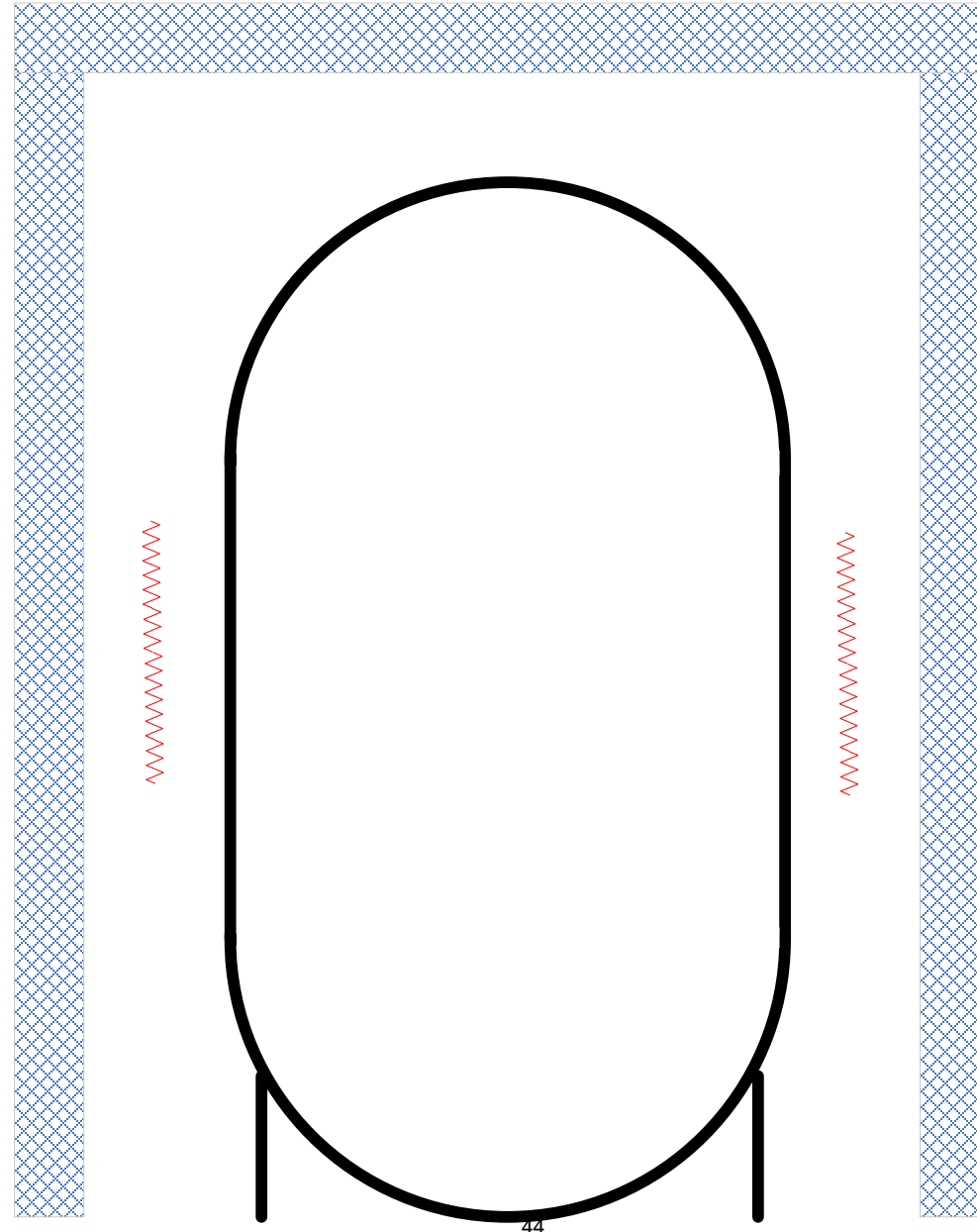
What happens when
the temperature is well
below the pour point?
Next planned test.

Wax/Solid

Liquid



Insulated enclosure concept.
R15 insulation.



NORA Rebate Program – Documenting Energy Savings

In-Lab Hydronic System Study

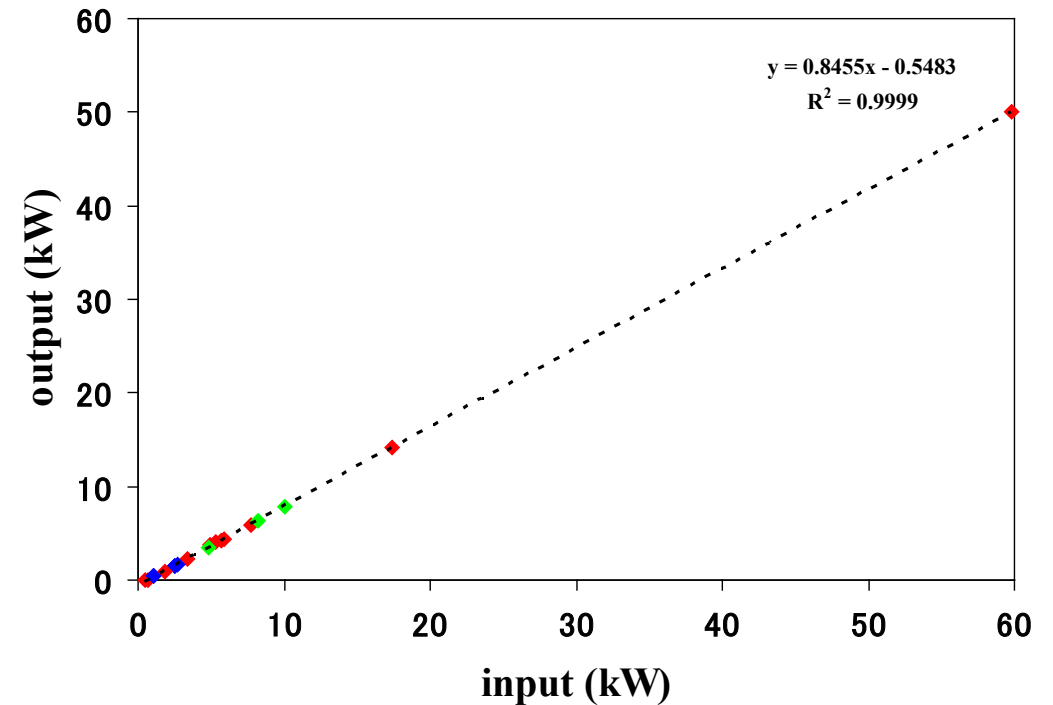
Key Results:

Idle Loss

Steady State Thermal

Annual energy savings of a modern, high efficiency integrated system relative to a base case, cast iron boiler – 24.5%

Summer domestic hot water efficiency – 25 to 75%



On-Line tool to estimate upgrade fuel and cost savings www.FSACalc.com

Oil Price:
\$ 3.00 Update

Reporting:
Displaying Savings

Chart Display:
#1 #2 #3

Mode:
Advance

Original Equipment:
Modify Assumption

Equipment #1:
Modify Atmospheric SSE 83.7 ▼

Equipment #2:
Modify Atmospheric SSE 83.7 ▼

Equipment #3:
Modify Atmospheric SSE 83.7 ▼

Annual Oil Consumption:
888 gallons

Annual Cost:
\$2664

Annual Oil Consumption:
784.8 gallons

Annual Cost:
\$2354

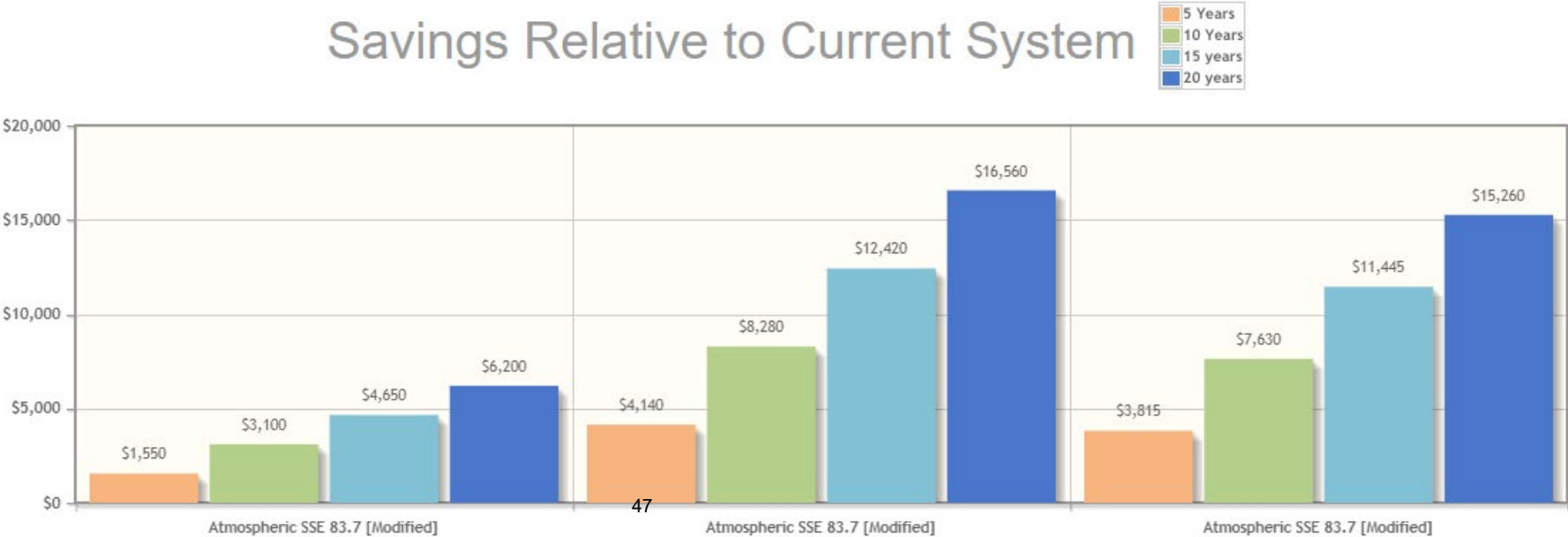
Annual Oil Consumption:
612 gallons

Annual Cost:
\$1836

Annual Oil Consumption:
633.6 gallons

Annual Cost:
\$1901

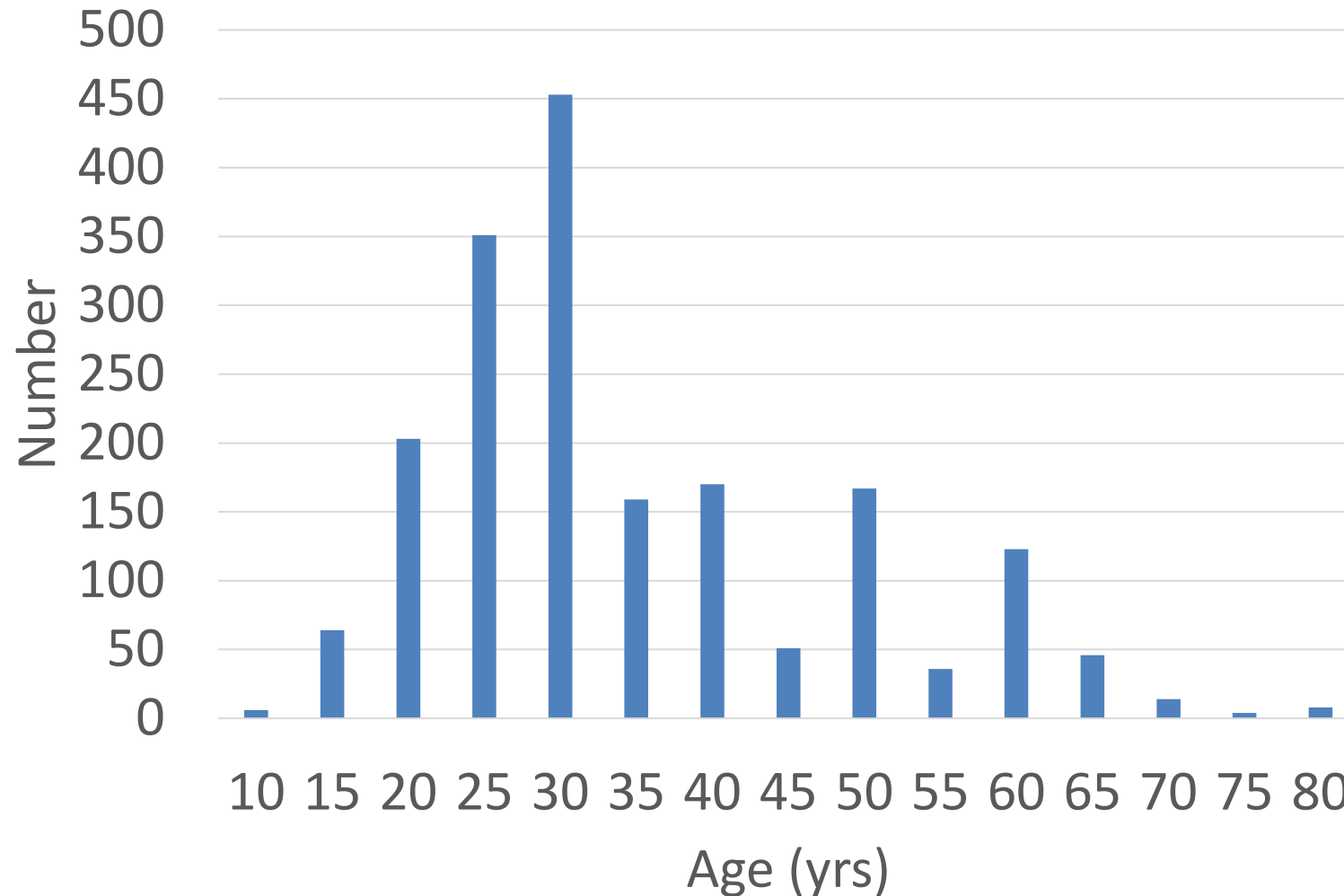
Savings Relative to Current System



NORA Rebate Program

- NORA funds administered by States;
- Example - \$500 for boiler upgrade
- Also applies to furnace, water heaters, tanks, controls, Smart thermostats;
- Reporting requirements in this program provide a resource to assess impact and conditions in the field.

Example – distribution of age of boilers replaced



Assessing Energy Savings

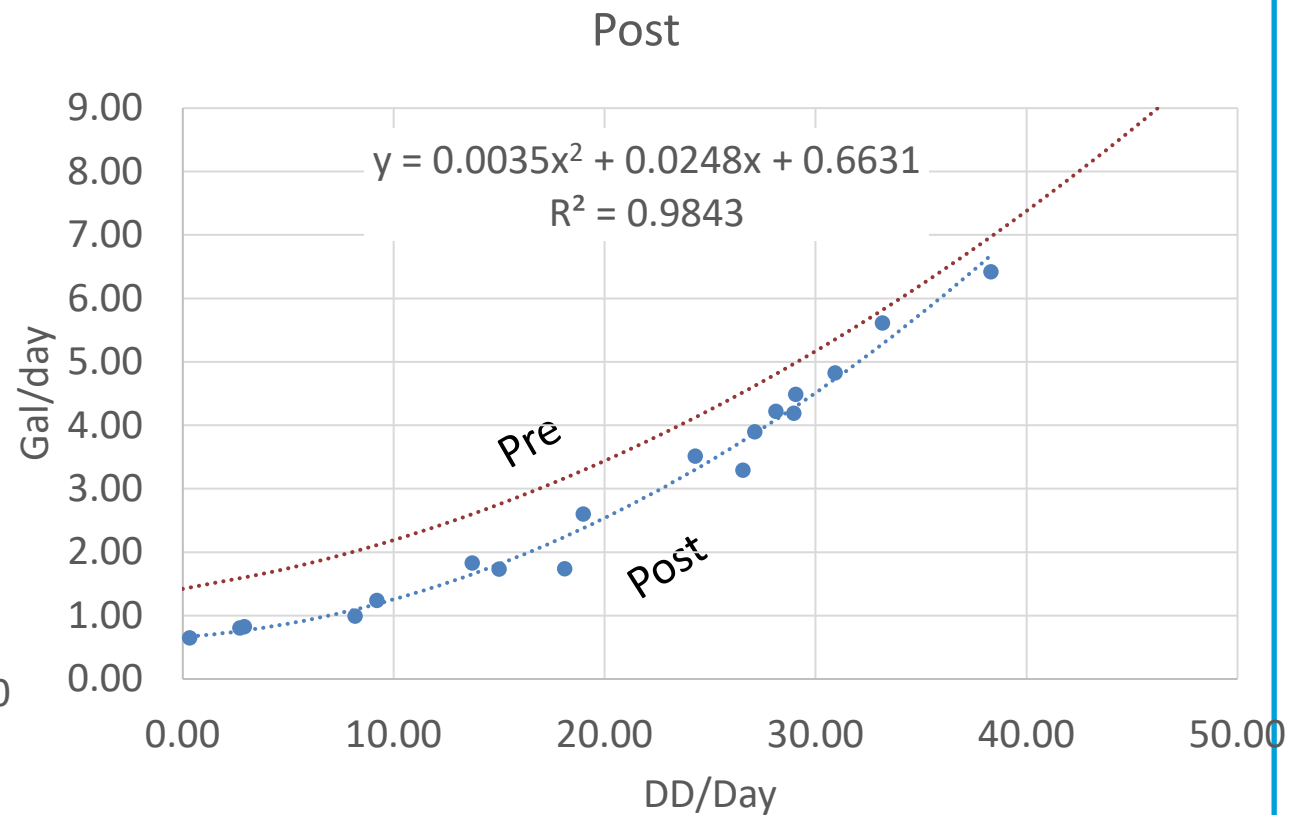
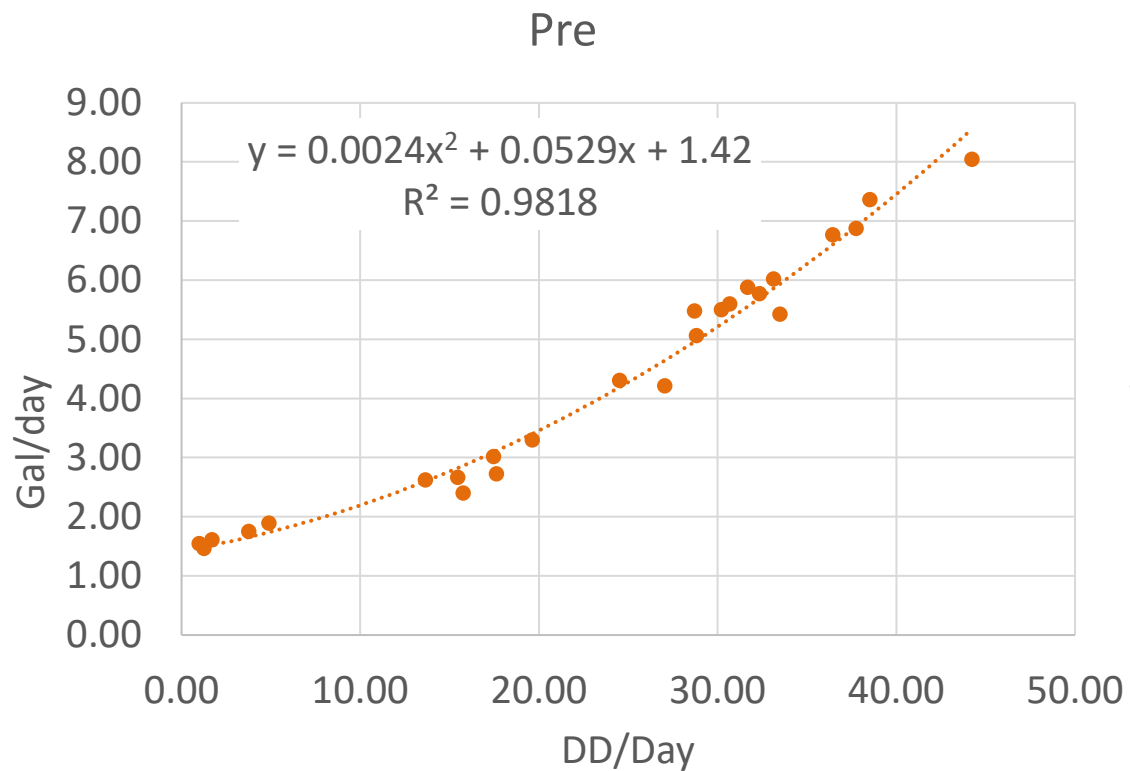
- Program reporting requirements include old and new boiler efficiency and historical fuel use. These are only estimates and not accurate enough to use for impact analysis;
- To assess energy savings fuel delivery data for several years before and after upgrade is used (not always available);
- In the U.S. 3-6 fuel deliveries per year are common. Relative to annual fills this provides more detail to enable fuel use vs load to be explored.

Methodology

- Regression analysis of fuel use vs Heating Degree Days following established protocol¹
- Using regression, calculate fuel use for model year – 2018 for New York area

1. Linear regression analysis of energy consumption data. www.degreedays.net/regression-analysis. Available ON-Line Bizee Degree Days

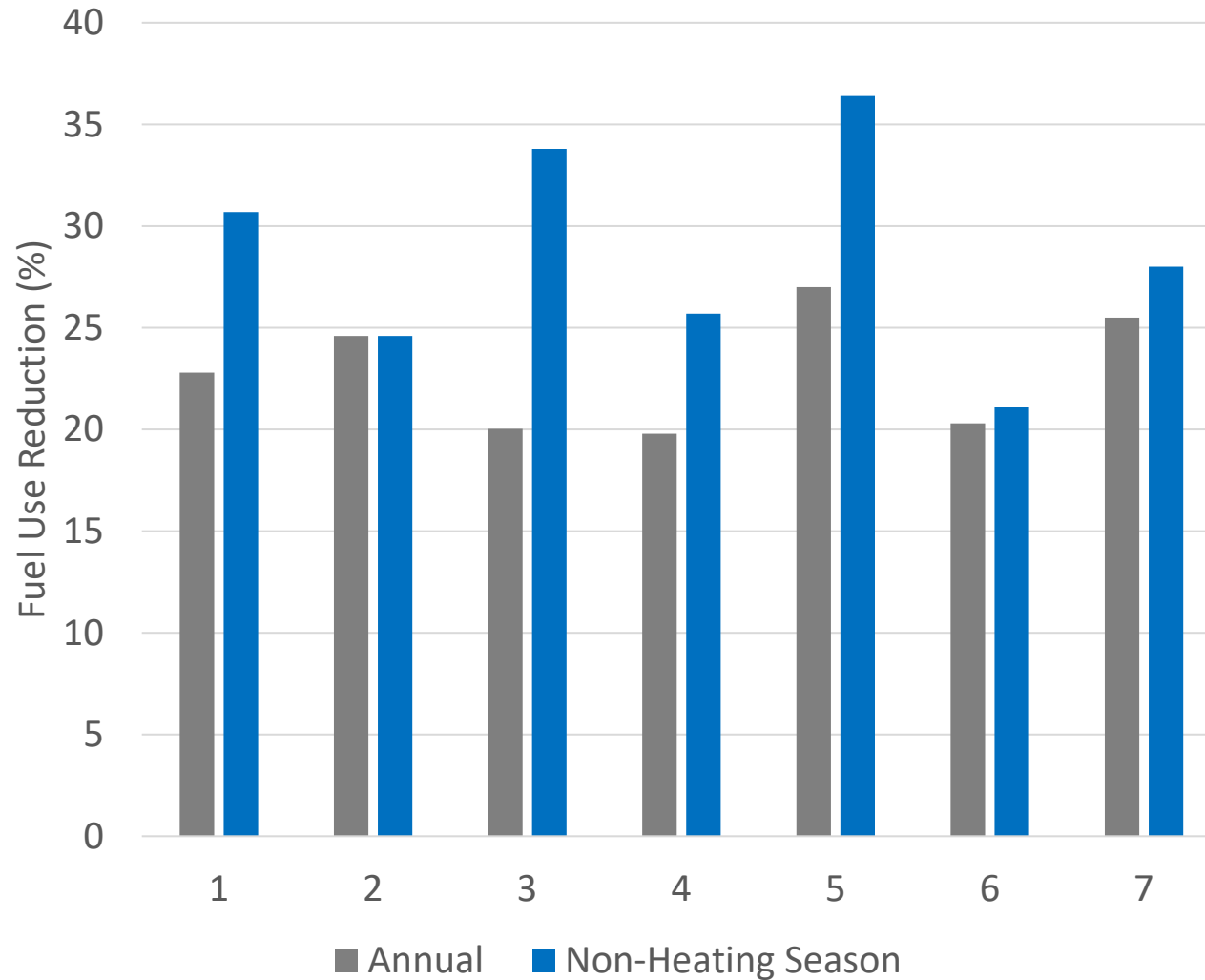
| Date | gallons | Degree Days | Days |
|------------|---------|-------------|------|
| 5/12/2020 | 134.80 | 875 | 50 |
| 3/23/2020 | 131.80 | 962 | 39 |
| 2/13/2020 | 343.80 | 1498 | 54 |
| 12/21/2019 | 122.20 | 827 | 30 |
| 11/21/2019 | 163.40 | 681 | 44 |
| 10/8/2019 | 139.90 | 92 | 119 |
| 6/11/2019 | 52.10 | 253 | 43 |
| 4/29/2019 | 150.60 | 653 | 40 |
| 3/20/2019 | 110.10 | 717 | 23 |
| 2/25/2019 | 70.40 | 581 | 19 |
| 2/6/2019 | 119.80 | 499 | 14 |
| 1/23/2019 | 145.70 | 1197 | 39 |
| 12/15/2018 | 152.00 | 686 | 24 |
| 11/21/2018 | 125.70 | 712 | 92 |
| 8/21/2018 | 150.10 | 64.8 | 97 |
| 5/16/2018 | 155.30 | 1059.7 | 60 |
| 3/17/2018 | 143.3 | 897.7 | 35 |
| 2/10/2018 | 155.3 | 975.8 | 31 |
| 1/10/2018 | 183.8 | 1140 | 29 |
| 12/12/2017 | 113.1 | 761.8 | 33 |



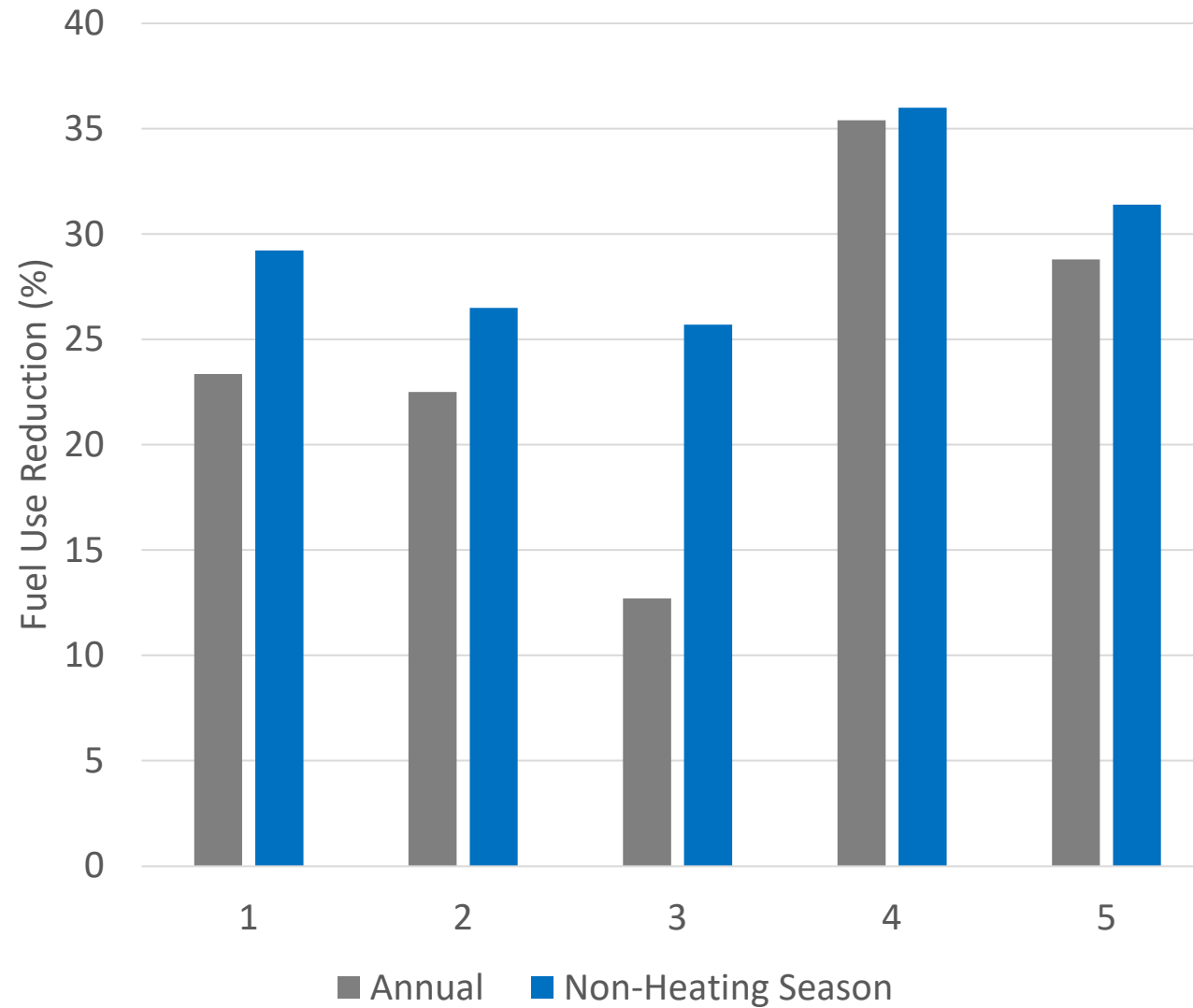
Things that can go wrong

Delivery requested for a fixed volume and not a fill;
Service company does not do a complete fill, follows a few days later to complete;
Wood stove use;
Irregular occupancy;
Insufficient data pre- and post- upgrade.

Example: Conversion to a Modern Boiler/Indirect Tank System



Example: Conversion to a Tankless with Advanced Controls



Discussion

- Upgrading existing equipment offers potential for energy savings in the 25% range. This directly translates to GHG emission reduction;
- Steady-state efficiency is important but management of low load losses offers more improvement potential;
- Advanced control concepts in addition to better thermal management may provide advances without large capital cost increases;
- Achieving these savings requires high efficiency equipment with low idle loss. Not all upgrades will achieve this but most equipment in the field ready for replacement can achieve this.
- Coupling efficiency improvements with biofuel use offers the potential for 85+% GHG reduction with a capital cost of \$10K relative to \$30-50K for total heat pump replacement and this can be done in the near term.

Next Steps

- Documentation of energy savings in the field with a broader range of equipment including upgrade to systems similar to those replaced;
- Detailed analysis report.

Tom Butcher
National Oilheat Research Alliance
tbutcher@noraweb.org
(571) 234 7756

NORA R&D Team: Ryan Kerr, Neehad Islam, John Levey, Bob O'Brien, Tom Butcher

NORA Board Meeting 9/22/2020

Education Report



Bronze & Silver Programs

Changes to tests & manual.



Certification Tests

- Positive response to new versions
1. Bronze & silver are different
 2. 75 questions
 3. Pool of questions

Certification Tests

- Majority of schools successfully using online testing
- Online proctored exams for new instructors due to geography and/or Covid- 19

Technician's manual

Continuing to rewrite chapters to reflect current equipment in the field.

“This ain't your fathers oil industry”



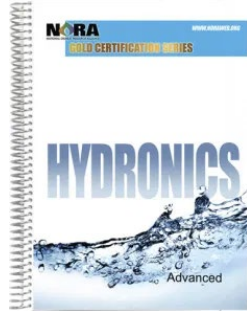
Bronze Programs

- Lehigh-Carbon CC – PA
- Central Maine CC
- Nassau Boces - NY

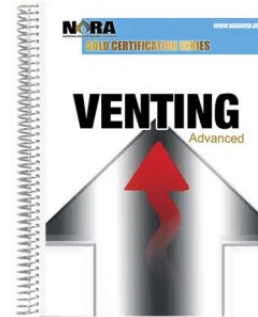
In-house Bronze Programs

- Eastern Propane
- Irving Oil
- Isaac Heating

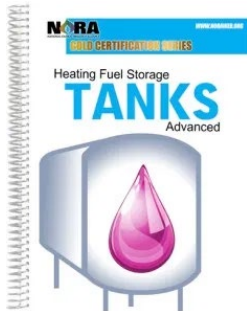
Gold Program Online



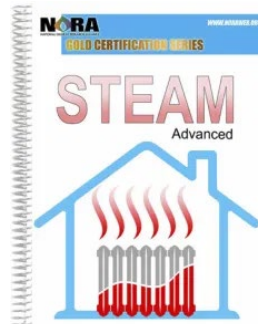
297



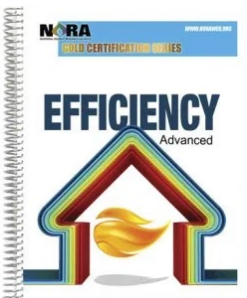
In process



30

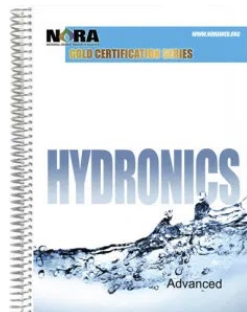


Up next

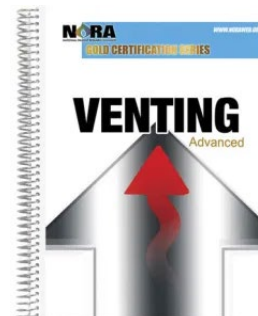


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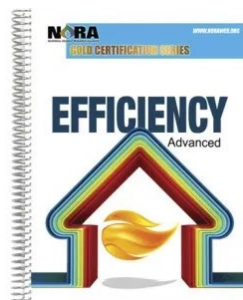
Gold Program Equivalents



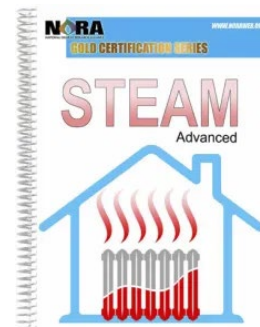
Taco
Peerless
Weil-McLain



Field



BPI



Peerless

CEUs

- Bioheat technical guidance online – 25 users
- Added emphasis on manufacturers & reps to add online content

New Website Tool

**Have a service or technical question
you would like answered by NORA?**



Ask Your Question

In keeping with its mission to enhance industry education & training, NORA's R&D and Technical Service teams are available to answer your questions regarding the safe, reliable & efficient operation of your customer's system including: biodiesel, delivery, tanks, combustion, venting, heat distribution, hot water, components and efficiency.

Please enter your question below and NORA's team will respond as soon as possible. NORA will also post your Q&A to its library. It will be anonymous, your name will not be shared.

Name:*

First

Last

E-mail:*

State:*

Phone:

Area Code

Phone Number

What is your
question?*



Previous Questions

National Oilheat Research Alliance > Technical Q & A

Technical Q & A

Technical/Service Questions & Answers

In keeping with its mission to enhance industry education & training, NORA's R&D and Technical Service teams are available to answer your questions regarding the safe, reliable & efficient operation of your customer's system.

☒ Combustion

☒ Tanks



Responses

▲ Combustion

Q- I accidentally set my analyzer for propane when doing a combustion test on an oil system. I spotted it and changed the fuel setting to oil. What would have happened if I did not notice the error?

Before answering your question, let's review how combustion analyzers work.

Almost all analyzers work by measuring the O₂ content of the flue gas and calculating a CO₂ equivalent based on the fuel it is set for.

Some UEI brand analyzers use an optical CO₂ sensor and read CO₂ directly, if you were using one of these, no worries! Your CO₂ number would be correct although your efficiency number would be wrong.

Assuming you were not using a UEI, your CO₂ reading would be about 1.1% less than it actually was. This is a pretty substantial difference. If you set the unit for what you thought was 12% CO₂ and it was 13.1% CO₂ it could lead to a bad situation.

Alternatively, you could use O₂ to adjust and you would always be right, regardless of the fuel. This is why it's important to always set for a trace amount of smoke to determine which side of the curve you are on and then increase the air until you drop the CO₂ from 1% to 1.5%.

It's a good practice to always double check to be sure that you have the analyzer set for the correct fuel and have it calibrated according the manufacturer's instructions.

Planning for the Future

9-18 Zoom meeting with association trainers

- Best practices for in person sessions
- Transition to online education
 - Bronze with a combination of Zoom type classes and hands on with employer?

Planning for the Future

- NORA as center of info
- Short videos not designed for instructional purposes
- Task oriented videos

Questions??



Officers and Executive Committee

Proposed 2021

| | |
|----------------------------|--------------------|
| Immediate Past Chairperson | – Charlie Uglietto |
| Chairman | - Rick Bologna |
| First Vice-Chairman | - |
| Second Vice-Chairman | - |
| Treasurer | - Eric DeGesero |
| President | - John Huber |

Executive Committee

| | |
|------------------|----------------------------------|
| John McCusker | Global |
| Mario Bouchard | Granby Industries |
| Steve Clark | Genessee Fuel |
| Charles Uglietto | Cubby Oil |
| Matt Meehan | Mirabito Fuels |
| Matt Cota | Vermont Fuel Dealers Association |
| Rick Bologna | Westmore Fuels |
| Leann Panebianco | Panco Petroleum |
| Kate Duffey | D.E. Duffey & Sons |
| Scott Vadino | F.W. Webb |
| Sandra Farrell | Northboro Fuel |
| Michael Devine | World Energy |
| Gary Sippin | Sippin Energy |