

INTERNATIONAL DISTRICT ENERGY ASSOCIATION

# Primary-Secondary Steam District Energy Benefits

Welcome to maxi therm beyond steam™

Speaker:
Patrick Lach
Vice-President Sales & Business Development
Montreal, Quebec, Canada

# Housekeeping

## Webinar and Q&A Format

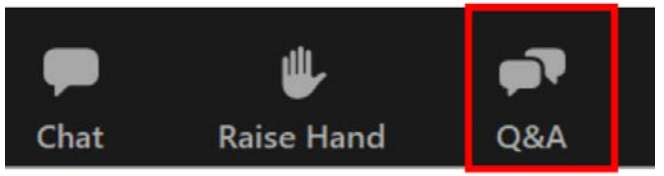
This webinar is scheduled for one hour, including the presentation and approximately 15 minutes for Q&A, which will take place throughout the webinar. If needed, the webinar will extend past the hour to answer as many audience questions as we can.

## This webinar will be recorded

and streamed on the IDEA website within 24 hours of the conclusion of this webinar. Registrants will also be sent a follow-up email with links to the recording and presentation slides. A link to the presentation slides is also provided in the chat box if you want to print out and follow along.

## How to Submit Questions

Please submit questions via the “Q&A” box during the presentation portion of the webinar. The Q&A icon can be found in the menu bar at the bottom of your screen. Questions will be reviewed by IDEA and posed to the presenters by the host at the conclusion of their presentation.




If you are having audio or video issues, please send a note via the Chat Box to our host, Jason Beal.



INTERNATIONAL DISTRICT ENERGY ASSOCIATION

# Primary-Secondary Steam District Energy Benefits

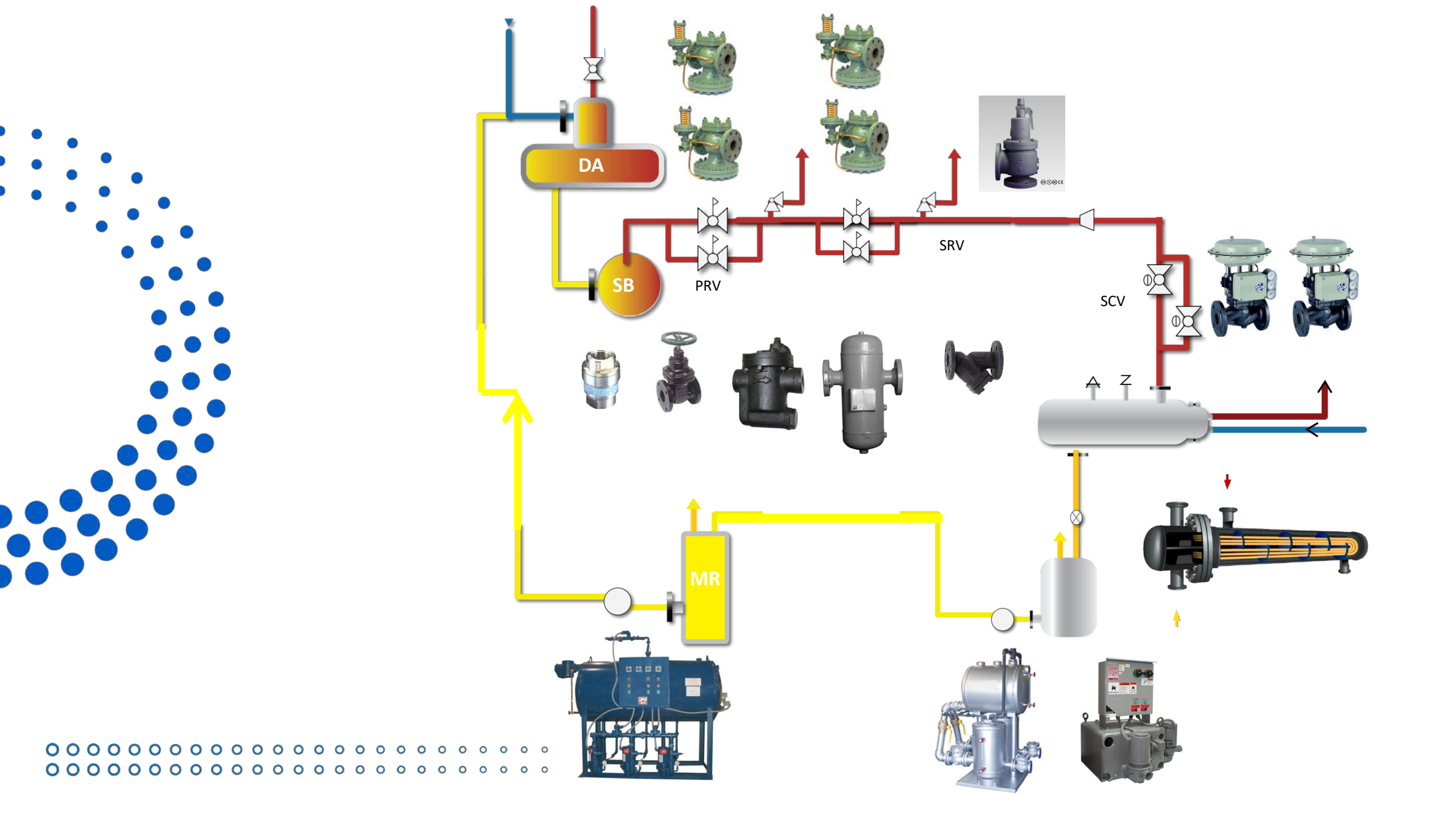
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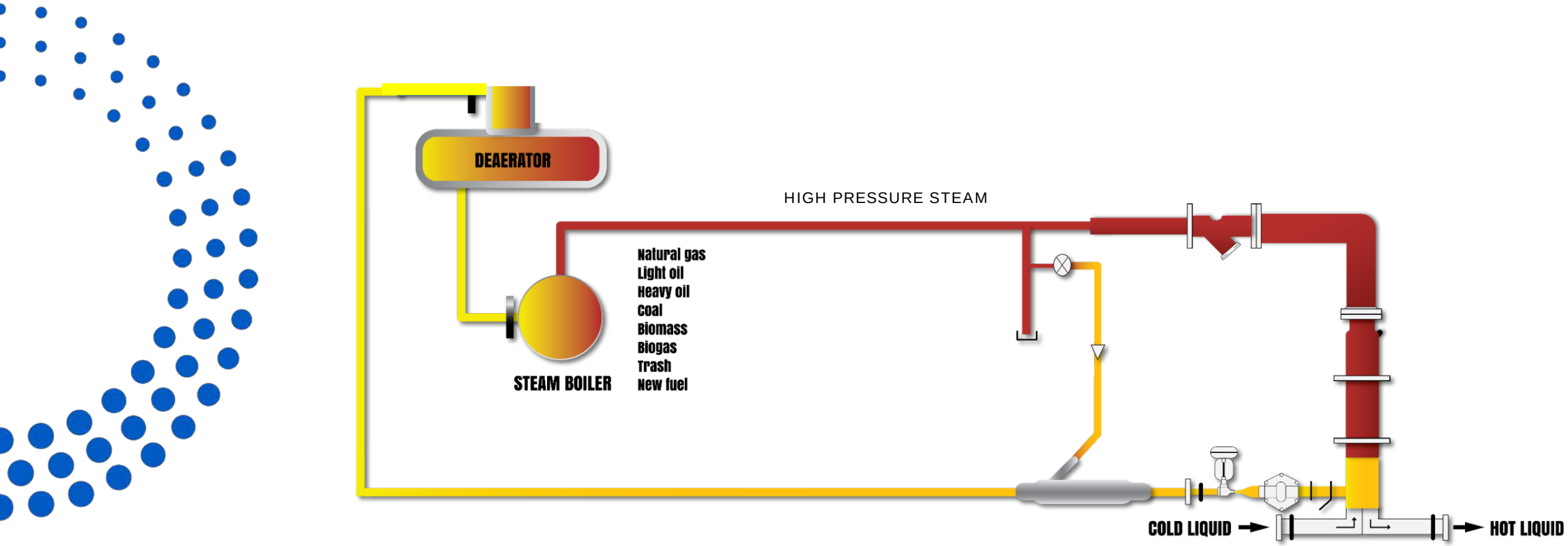
# Agenda

- Steam Basics
  - Piping
  - Thermodynamics
- Vertical Flooding Design
- 100% Steam condensate close loop
- 95% steam generation efficiency
- Hydronic hot water vs steam primary loop
- Top 5 reasons to consider steam
- Conclusion - Q & A

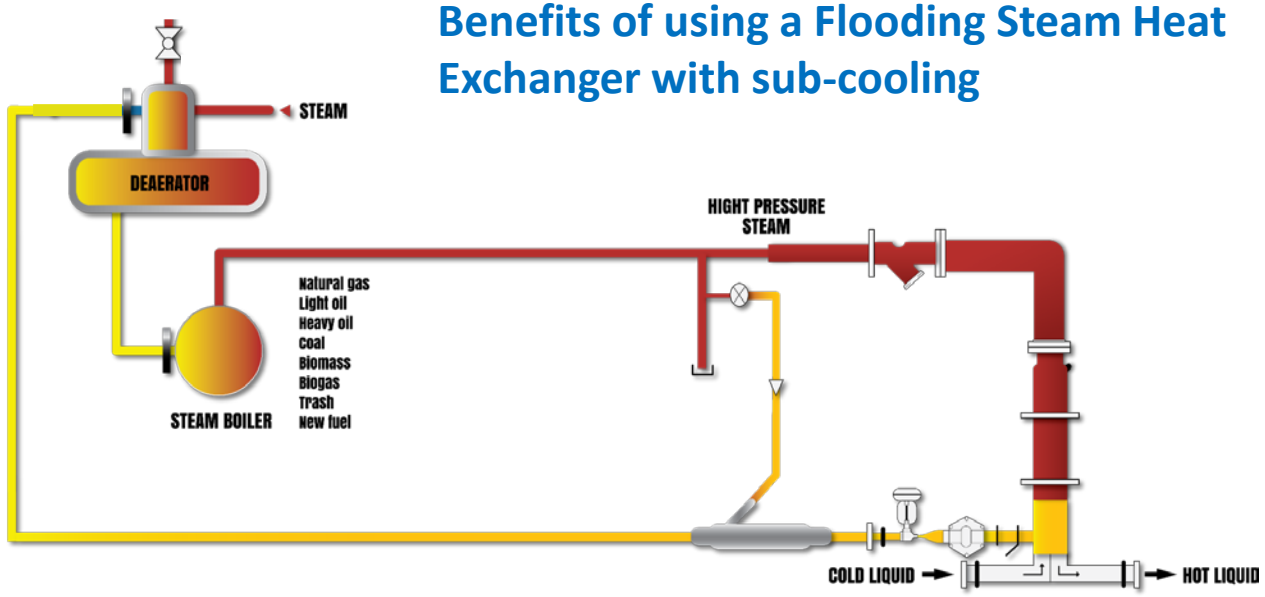
| (PSIG) | Temp | Sensible | Latent | Total | | Volume |
|---|---|---|---|---|---|---|
| 0 | 212 | 180 | 970 | 1151 | 0.01672 | 26.80 |
| 1 | 215 | 184 | 968 | 1152 | 0.01674 | 25.21 |
| 2 | 219 | 187 | 966 | 1153 | 0.01676 | 23.79 |
| 3 | 222 | 190 | 964 | 1154 | 0.01679 | 22.53 |
| 4 | 224 | 193 | 962 | 1155 | 0.01681 | 21.40 |
| 5 | 227 | 195 | 961 | 1156 | 0.01683 | 20.38 |
| 6 | 230 | 198 | 959 | 1157 | 0.01685 | 19.46 |
| 7 | 232 | 201 | 957 | 1158 | 0.01687 | 18.62 |
| 8 | 235 | 203 | 956 | 1159 | 0.01689 | 17.85 |
| 9 | 237 | 206 | 954 | 1160 | 0.01690 | 17.14 |
| 10 | 239 | 208 | 953 | 1160 | 0.01692 | 16.49 |
| 12 | 244 | 212 | 950 | 1162 | 0.01696 | 15.33 |
| 14 | 248 | 216 | 947 | 1163 | 0.01699 | 14.33 |
| 16 | 252 | 220 | 944 | 1165 | 0.01702 | 13.45 |
| 100 | 338 | 309 | 881 | 1190 | 0.01785 | 3.891 |
| 105 | 341 | 312 | 878 | 1190 | 0.01789 | 3.736 |
| 110 | 344 | 316 | 876 | 1191 | 0.01792 | 3.594 |
| 115 | 347 | 319 | 873 | 1192 | 0.01796 | 3.462 |
| 120 | 350 | 322 | 871 | 1192 | 0.01799 | 3.340 |
| 125 | 353 | 325 | 868 | 1193 | 0.01803 | 3.226 |


DA
SB
PRV
SRV
SCV
MR


HI PRESS STEAM


DEAERATOR
HIGH PRESSURE STEAM
Natural gas
Light oil
Heavy oil
Coal
Biomass
Biogas
Trash
New fuel
STEAM BOILER
COLD LIQUID
HOT LIQUID

# Benefits of using a Flooding Steam Heat Exchanger with sub-cooling




A. LESS MAKE-UP WATER
The boiler gets back more condensate, so you use less fresh water. This also means less softening, chemical treatment, bottom and surface blow down.

B. 0% FLASH LOSS
Condensate that is hot causes flash losses. Maxi-Therm sub-cools condensate below the saturation temperature eliminating flash loss.

C. NO STEAM PRV STATION
The Ideal Control System can use high, medium or low-pressure steam directly. Steam at any pressure gives application flexibility.

D. NO STEAM SAFETY RELIEF OR RECEIVER VENT TO ROOF
Many times, the vent piping is the most expensive part of the entire system. The Ideal Control System can eliminate the need for both the pressure relief and condensate receiver vent.

E. NO PUMPING SUB-STATION
The conventional heater will utilize a pump to push the condensate back to a central return station. The pump will require electricity or steam power, again using more energy. This power source will need a control system and isolation.

F. SMALLER STEAM INLET AND CONDENSATE PIPING
Higher steam pressure allows for smaller piping.

F. SMALLER CONTROL VALVE IMPROVES TURNDOWN

G. NO VACUUM BREAKER = NO AIR INJECTION
The Ideal Control System runs at constant pressure and a vacuum breaker is not needed. Independent site testing demonstrated six times less corrosion rate.

I. 5.4% to 20% ENERGY SAVING & GREENHOUSE GAS REDUCTION

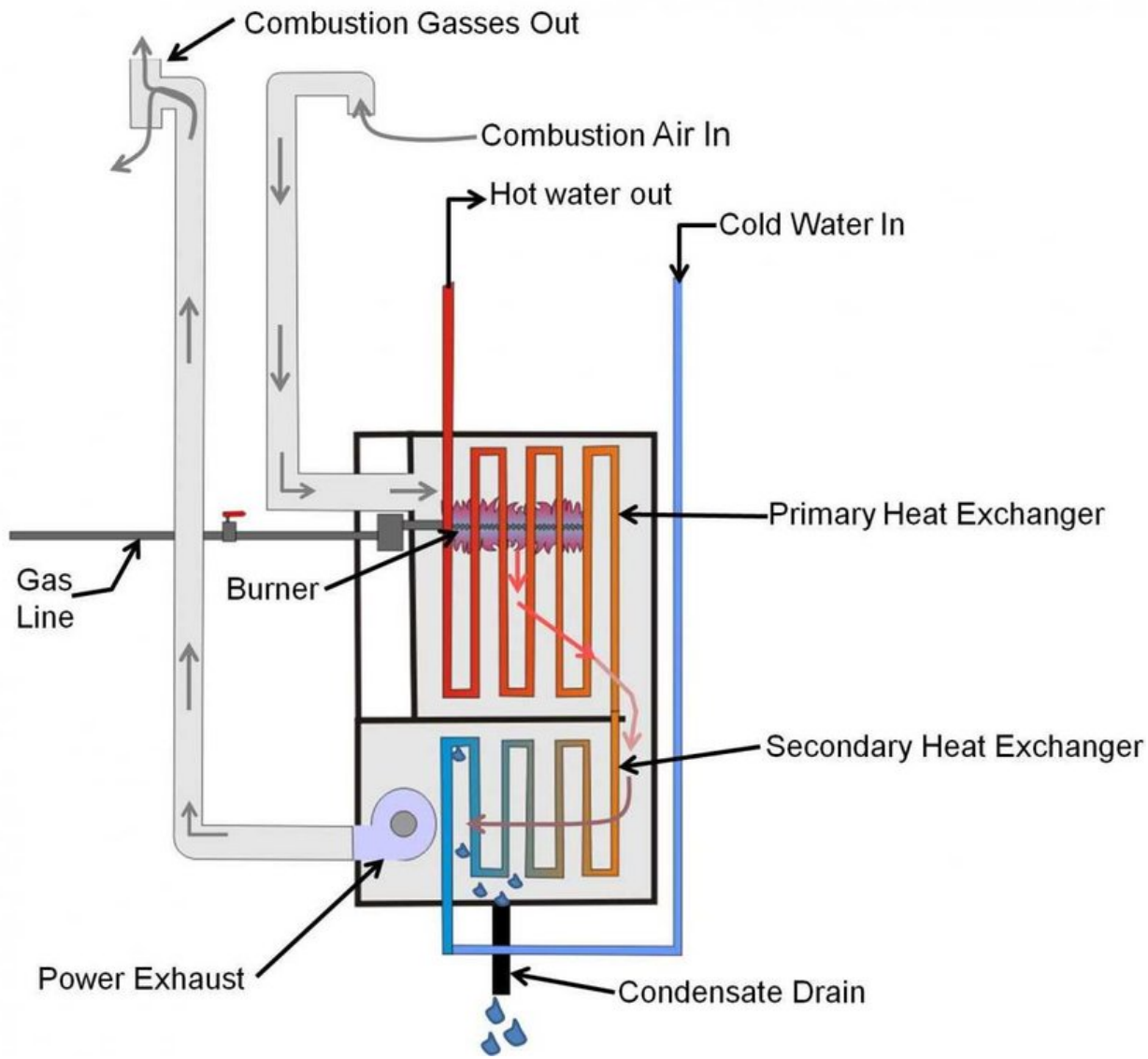
J. STABILITY OF SET POINT TEMPERATURE ± 2˚F

K. ELIMINATING COMPONENTS LOWERS MAINTAINENCE COSTS

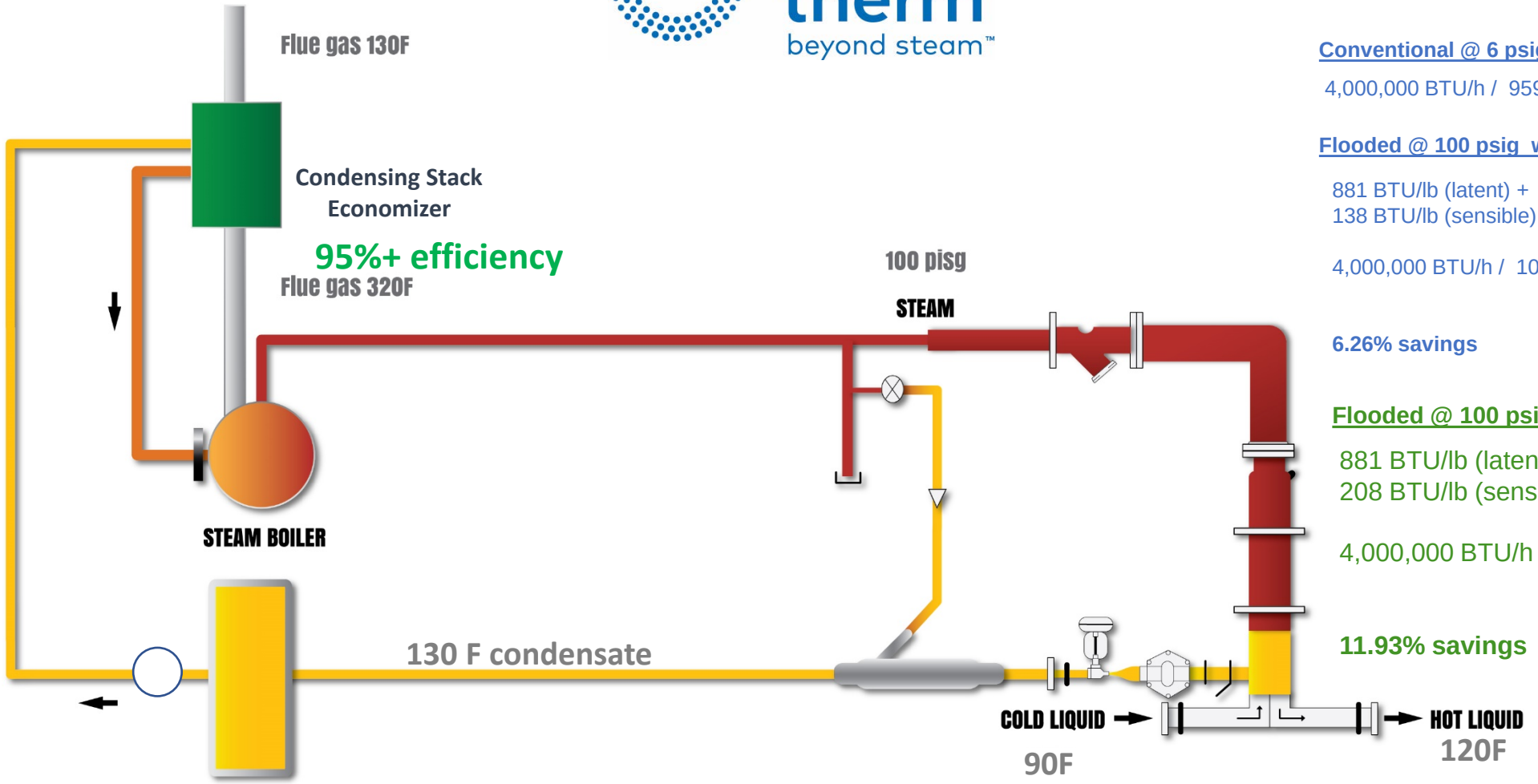
L. 50:1 SYSTEM TURNDOWN

M. LESS BLOWDOWN = LESS MAKE-UP
Due to our “CLOSED LOOP” design

N. LESS CHEMICAL FOR THE BOILER AND RETURN LINES


Combustion Gasses Out
Combustion Air In
Hot water out
Cold Water In
Primary Heat Exchanger
Gas Line
Burner
Secondary Heat Exchanger
Power Exhaust
Condensate Drain

maxi therm
beyond steam™




**Conventional @ 6 psig**

4,000,000 BTU/h / 959 BTU/lb = 4,171 lbs/h

**Flooded @ 100 psig w/ 200F condensate outlet**

881 BTU/lb (latent) +
138 BTU/lb (sensible) = 1019 BTU/lb total heat

4,000,000 BTU/h / 1019 BTU/lb = 3,925 lbs/h

**6.26% savings**

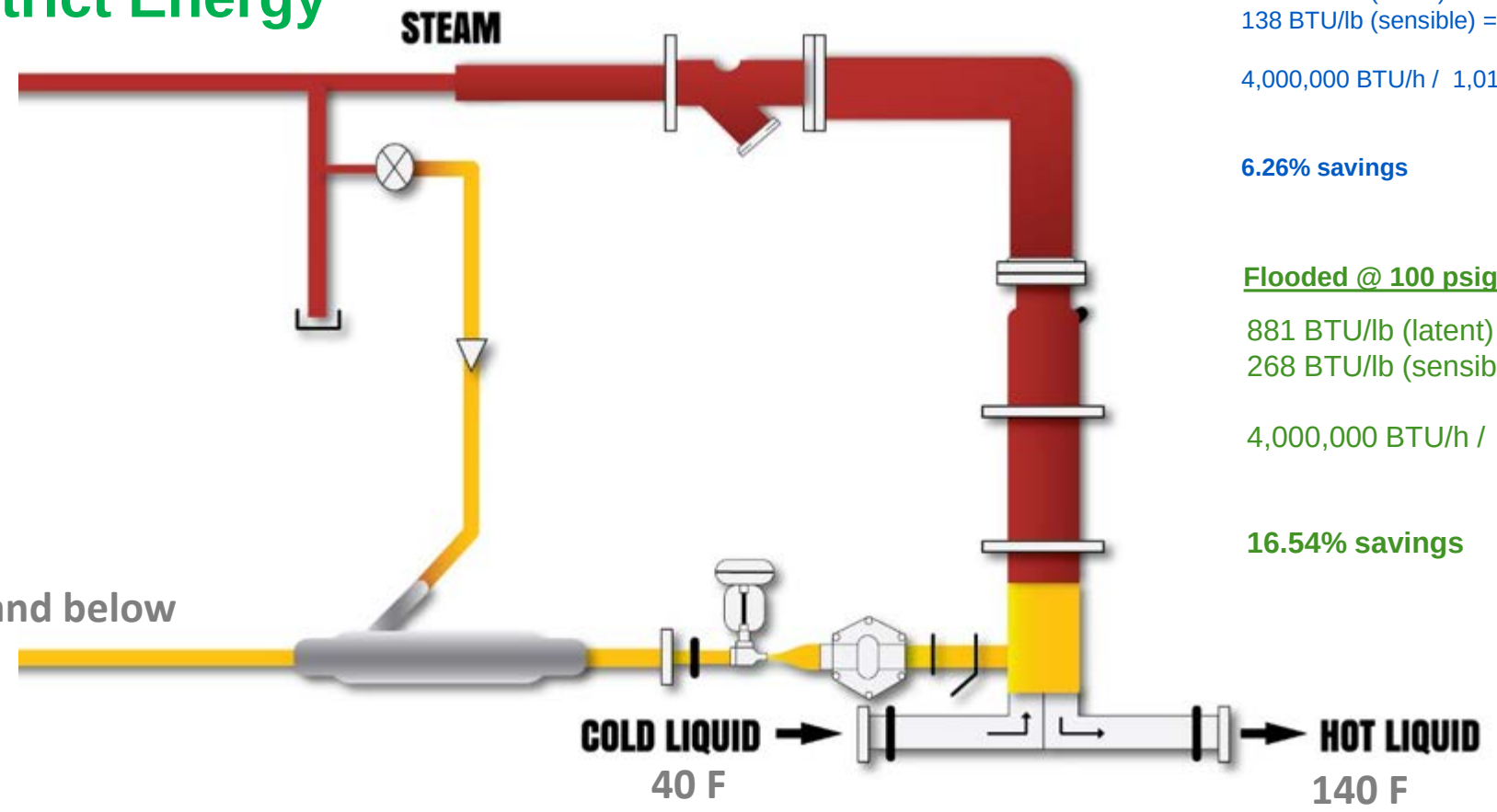
**Flooded @ 100 psig w/ 130F condensate outlet**

881 BTU/lb (latent) +
208 BTU/lb (sensible) = 1089 BTU/lb total heat

4,000,000 BTU/h / 1,089 BTU/lb = 3,673 lbs/h

**11.93% savings**

# District Energy




**Conventional @ 6 psig**

4,000,000 BTU/h / 959 BTU/lb = 4,171 lbs/h

**Flooded @ 100 psig w/ 200F condensate outlet**

881 BTU/lb (latent) +
138 BTU/lb (sensible) = 1,019 BTU/lb total heat

4,000,000 BTU/h / 1,019 BTU/lb = 3,925 lbs/h

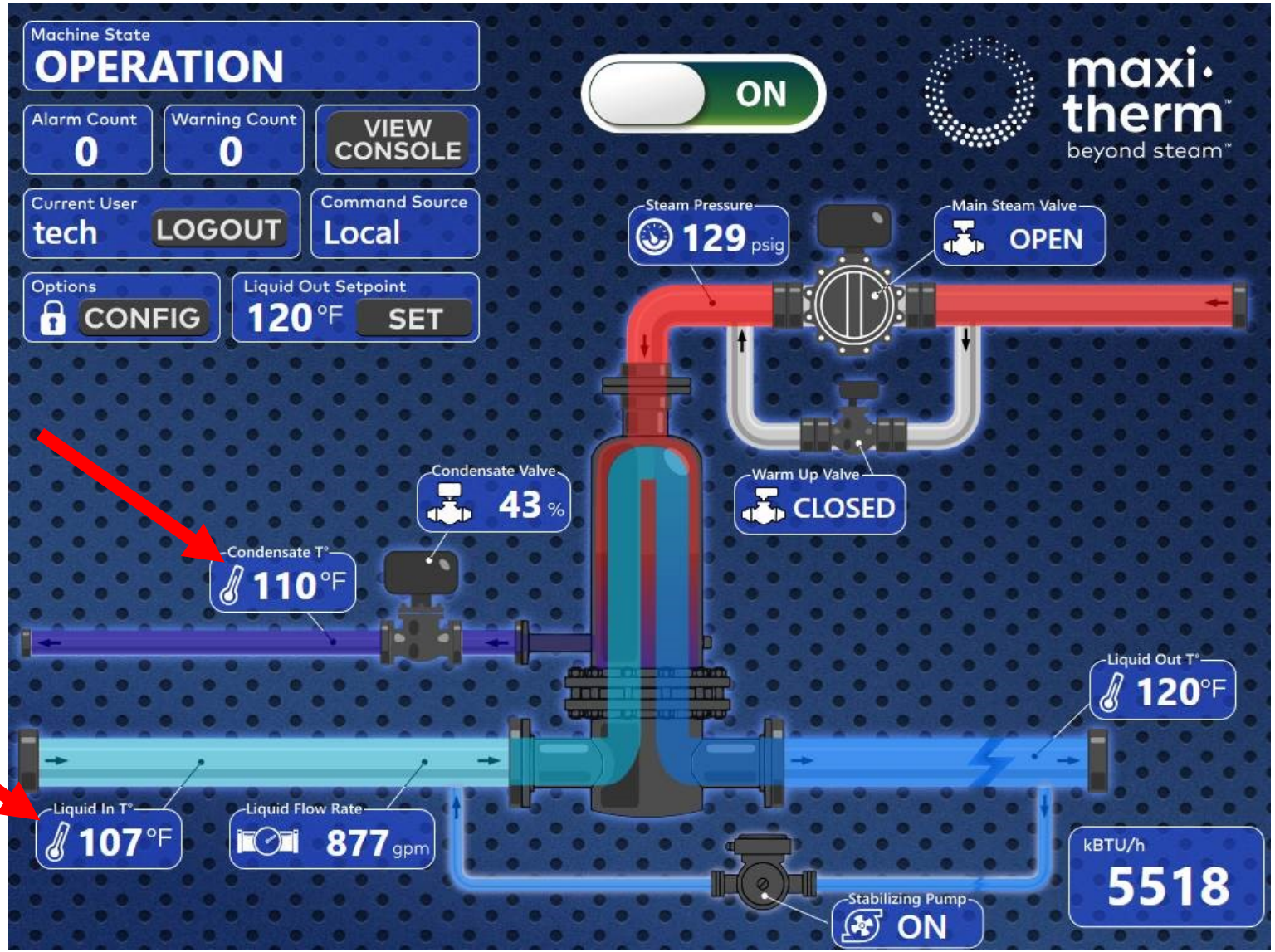
**6.26% savings**

**Flooded @ 100 psig w/ 70F condensate outlet**

881 BTU/lb (latent) +
268 BTU/lb (sensible) = 1,149 BTU/lb total heat

4,000,000 BTU/h / 1,149 BTU/lb = 3,481 lbs/h

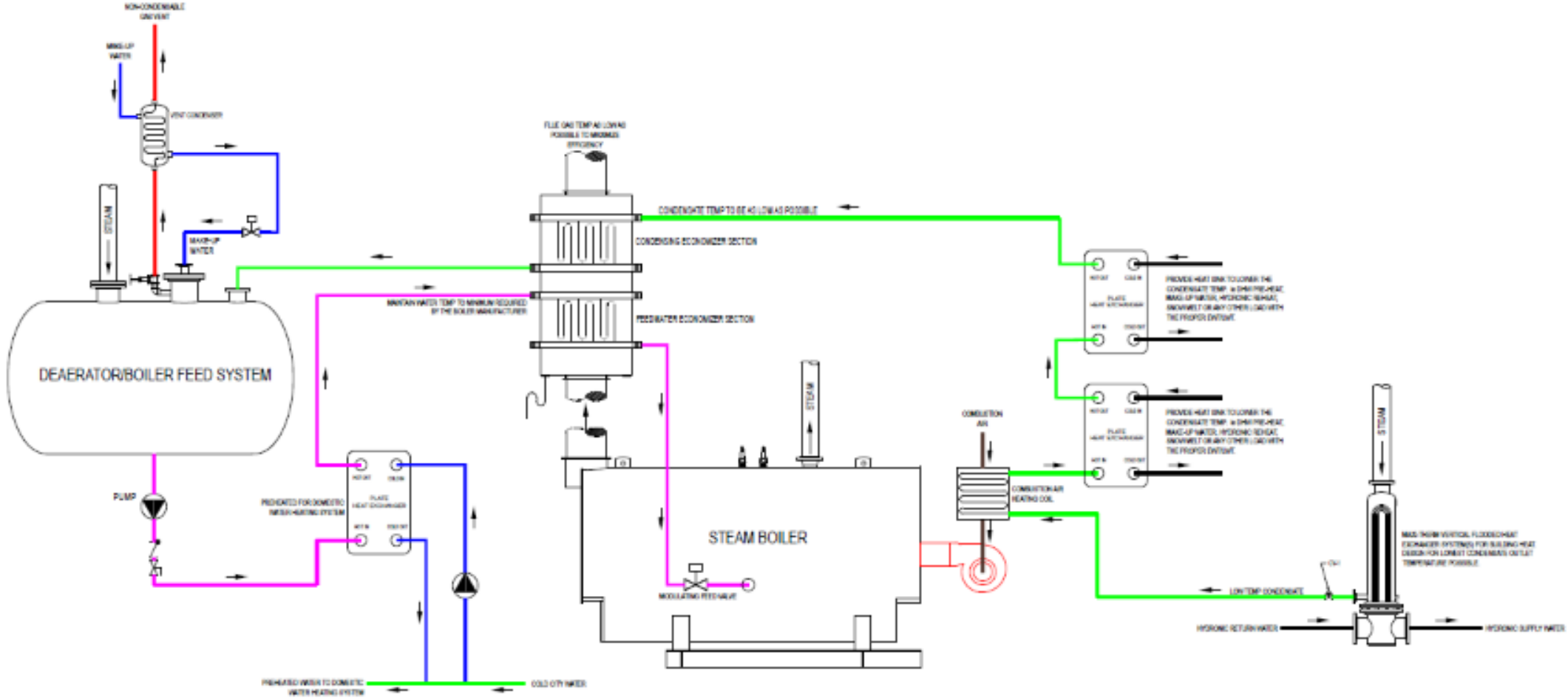
**16.54% savings**


Machine State
OPERATION
ON
maxi·therm
beyond steam™
Alarm Count
0
Warning Count
0
VIEW CONSOLE
Current User
tech
LOGOUT
Command Source
Local
Options
CONFIG
Liquid Out Setpoint
120 °F
SET
Steam Pressure
129 psig
Main Steam Valve
OPEN
Condensate Valve
43 %
Warm Up Valve
CLOSED
Condensate T°
110 °F
Liquid Out T°
120 °F
Liquid In T°
107 °F
Liquid Flow Rate
877 gpm
kBTU/h
5518
Stabilizing Pump
ON

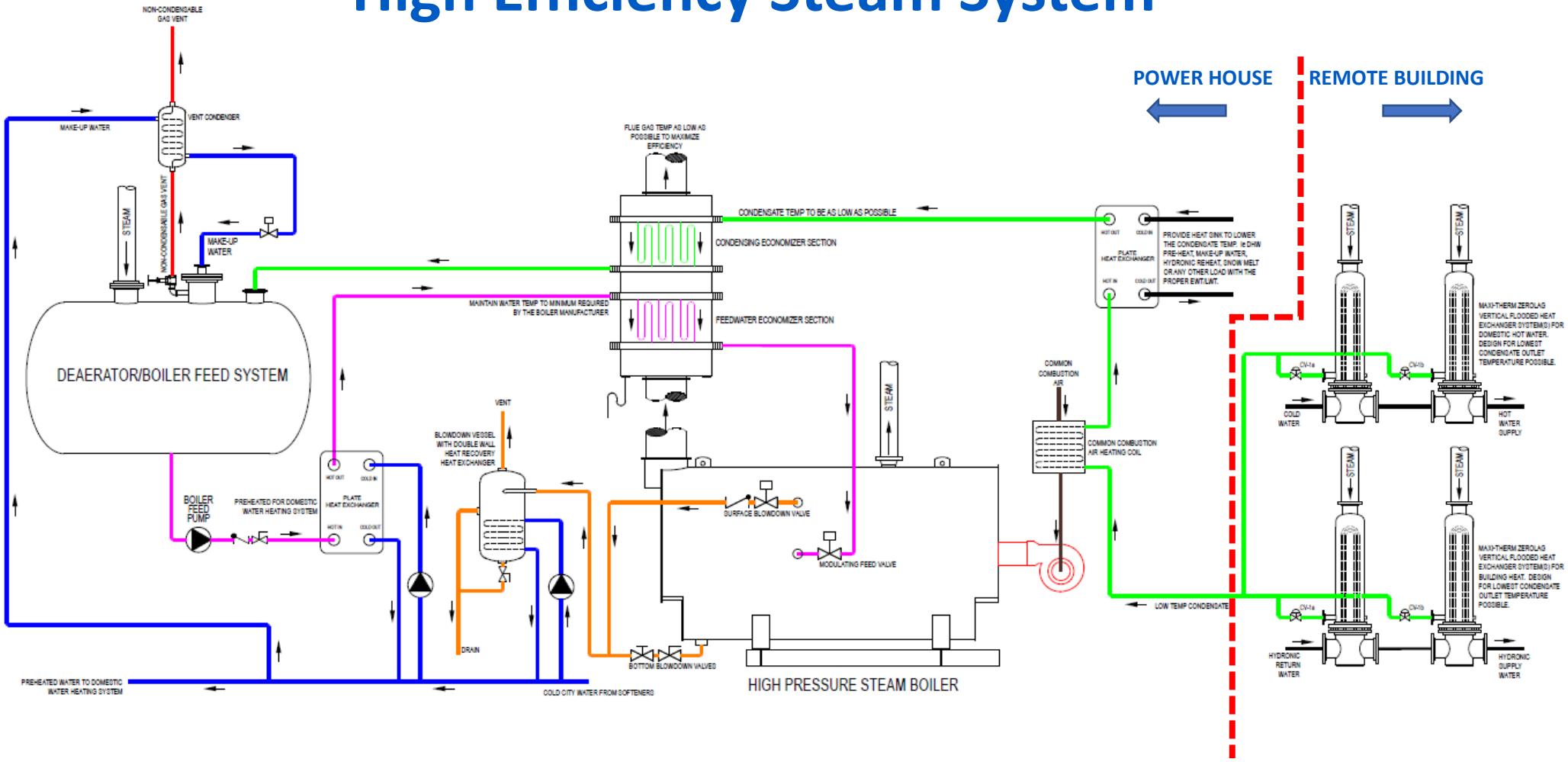
# 100% Steam & Condensate Closed Loop

95%+ Efficiency Steam Generation




DEAERATOR/BOILER FEED SYSTEM
PUMP
STEAM BOILER
CONDENSING ECONOMIZER SECTION
FEEDWATER ECONOMIZER SECTION
COMBUSTION AIR
COMBUSTION AIR HEATING COIL
STEAM
MAKE-UP WATER
HYDRONIC RETURN WATER
HYDRONIC SUPPLY WATER

# High Efficiency Steam System

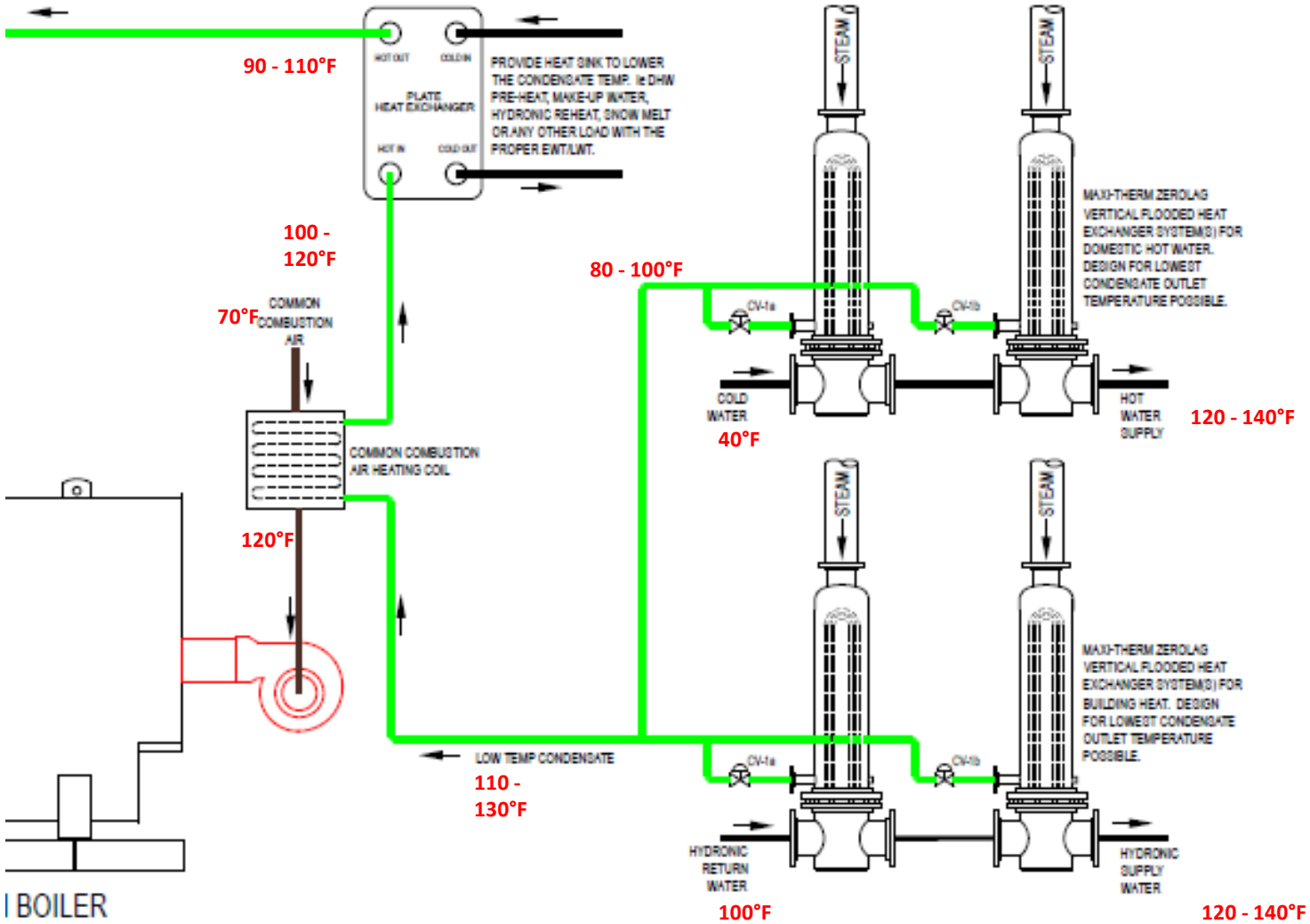



United States Application No: 63/286,132
Canadian Serial No: 3,183,035

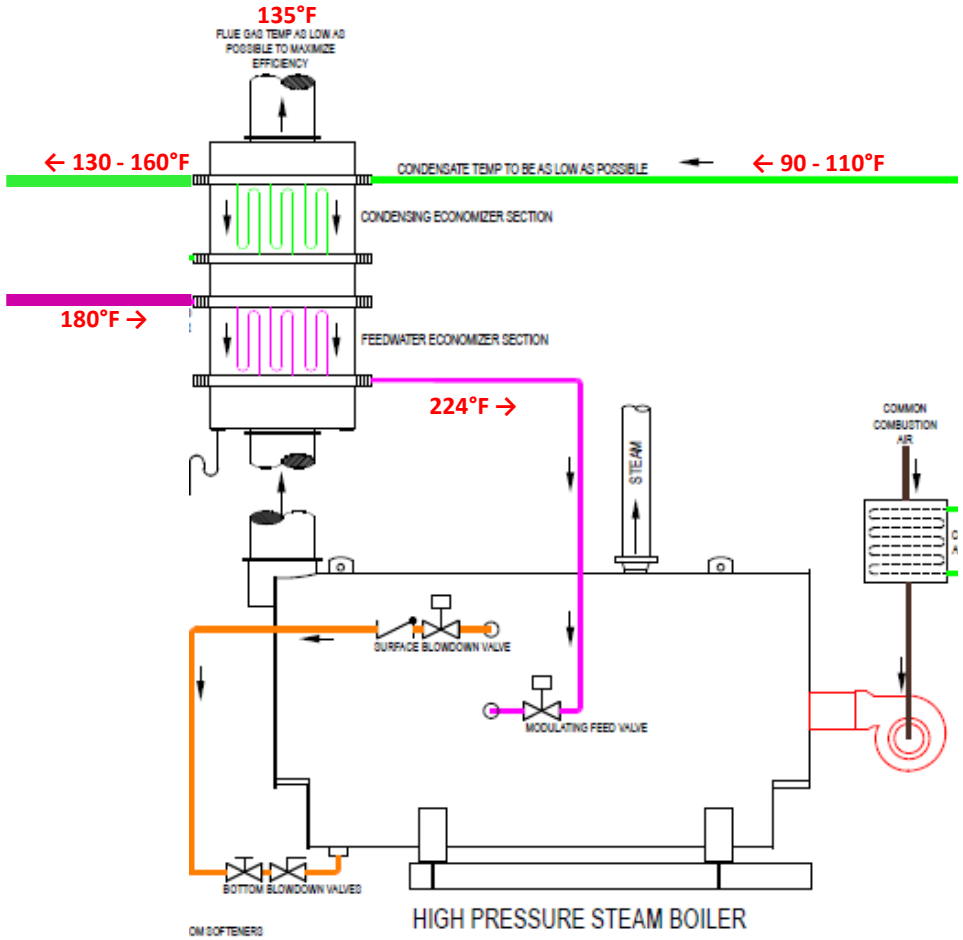
PATENT PENDING

maxi-therm
beyond steam™

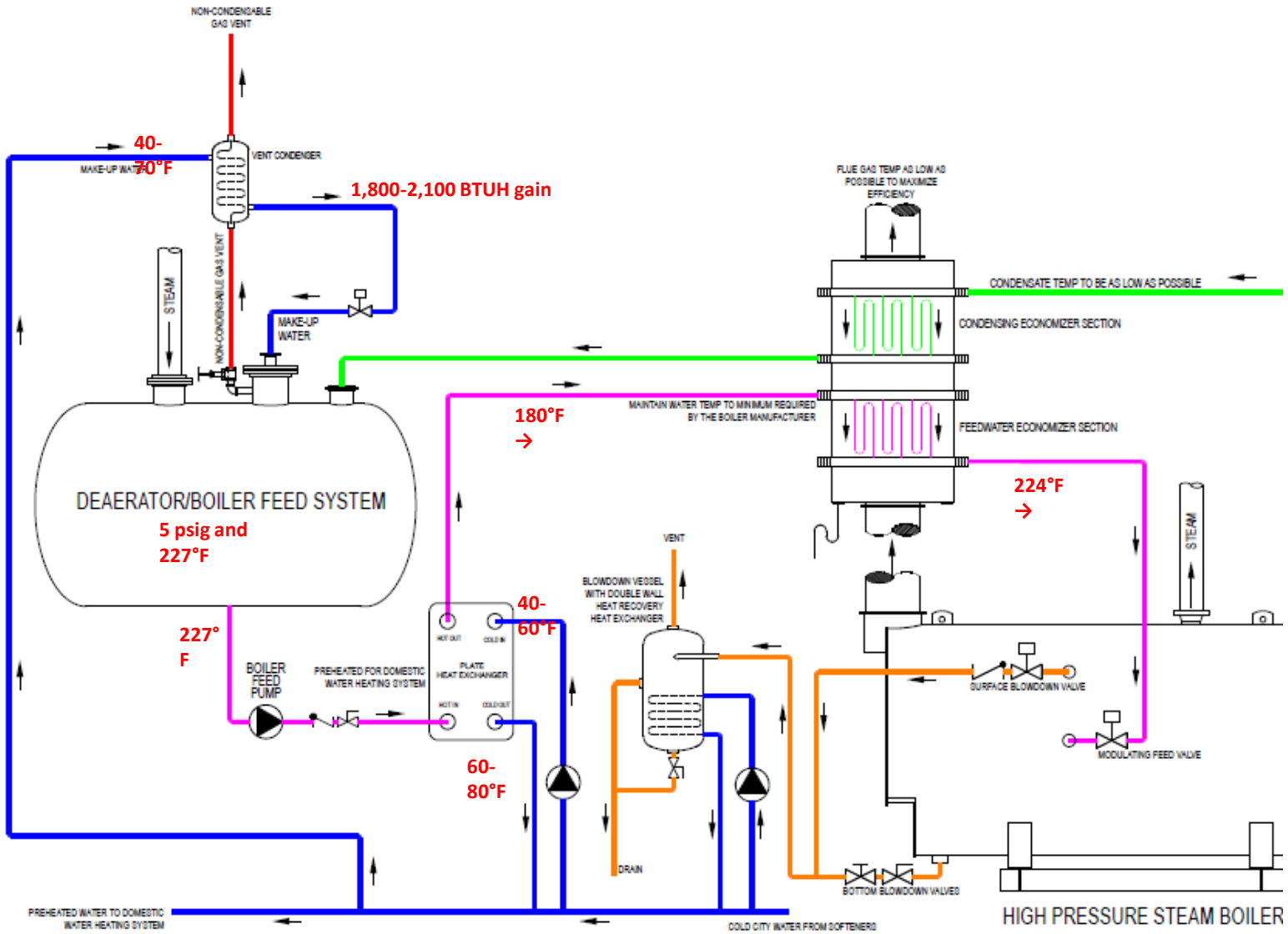
# High Efficiency Steam System



# High Efficiency Steam System



# High Efficiency Steam System



# Combustion Efficiency Calculator

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Boiler Size in PPH | 20,700 | | Input: | 24,415 | MBH | (based on | 82.3% | efficiency) | |
| Measured % $O_2$ in flue | 3.00 | | Calc. $CO_2$ | 10.4 | % | ($CO_{2max}$ = 12.1% for nat gas) | | | |
| Boiler Leaving Flue Gas Temp. Gross | 450.0 | °F $T_i$ or $T_f$ | | 5,481.0 | CFM | (Combustion Air Volume based on | | 95.06% | efficiency) |
| Economizer Leaving Flue Gas Temp. Gross | 135.0 | °F $T_i$ or $T_f$ | Input: | 21,728 | MBH | (based on | 95.1% | efficiency) | |
| Ambient Air Temp. | 70.0 | °F EAT into combustion air preheat coil | | | | | | | |
| Combustion Air Temp. into Burner | 120.0 | °F LAT from combustion air preheat coil | | | | | | | |
| Water temp. into the Comb. Air Preheat Coil | 130.0 | °F EWT | | | | | | | |
| Water temp. out of the Comb. Air Preheat Coil | 110.0 | °F LWT to additional plate heat exchanger(s) | | | | | | | |
| Additional water temp reduction | 20.0 | °F This reduction is from the plate heat exchanger(s) | | | | | | | |
| Nominal Economizer flow PPH | 20,700 | PPH Flow will vary with firing rate | | | | | | | |
| Water temp. into the condensing economizer | 90.0 | °F EWT economizer | | | | | | | |
| Water temp. out of the condensing economizer | 157.0 | °F LWT economizer | | | | | | | |
| Latent heat recovered - economizer | 518,660 | BTUH Recovered | | | | | | | |
| Water temp. into the feed water economizer | 160.0 | °F EWT economizer | | | | | | | |
| Water temp. out of the feed water economizer | 209.0 | °F LWT economizer | | | | | | | |
| Sensible heat recovered - economizer | 2,035,047 | BTUH Recovered | | | | | | | |
| Total feed water & condensing economizer | 2,553,707 | BTUH Recovered - Total | | | | | | | |

| | | |
|---|---|---|
| **Combustion Efficiency Nat. Gas =** | **82.3%** | **Before the Air Preheat Coil** |
| **Combustion Efficiency Nat. Gas =** | **84.6%** | **After the Air Preheat Coil but before the Water Economizer** |
| **Combustion Efficiency Nat. Gas =** | **95.1%** | **After the 2-Stage Economizer** |

# Energy Tips right from the DOE website

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy — ADVANCED MANUFACTURING OFFICE

| | |
|---|---|
| **Energy Tips: STEAM** | Steam Tip Sheet #24 |
| **Upgrade Boilers with Energy-Efficient Burners** | |
| **Energy Tips: STEAM** | Steam Tip Sheet #3 |
| **Use Feedwater Economizers for Waste Heat Recovery** | |
| **Energy Tips: STEAM** | Steam Tip Sheet #26a |
| **Consider Installing a Condensing Economizer** | |
| **Energy Tips: STEAM** | Steam Tip Sheet #13 |
| **Use a Vent Condenser to Recover Flash Steam Energy** | |
| **Energy Tips: STEAM** | Steam Tip Sheet #10 |
| **Recover Heat From Boiler Blowdown** | |
| **Energy Tips: STEAM** | Steam Tip Sheet #20 |
| **Replace Pressure-Regulating with Backpressure Turbogenerators** | |

**Energy Tips – Process Heating**



Process Heating Tip Sheet #1 • November 2007 — Industrial Technologies Program

**Preheated Combustion Air**

# The Closed Loop concept keeps the best advantages and avoids all major disadvantages:

- Generates water & steam at +95% efficiency
- Dual fuel with lower maintenance
- Higher reliability with long lifespan
- Consolidates both space and combustion into one system
- Proven and familiar equipment
- Virtually zero air infiltration means lower corrosion levels
- Much lower water treatment and chemical costs
- Reduced need for a deaerator, consider a heated feedwater tank instead.
- Blowdown rates below 1% = very low make-up rates
- Low condensate temp allows non-metalic (PEX) piping for return to powerhouse



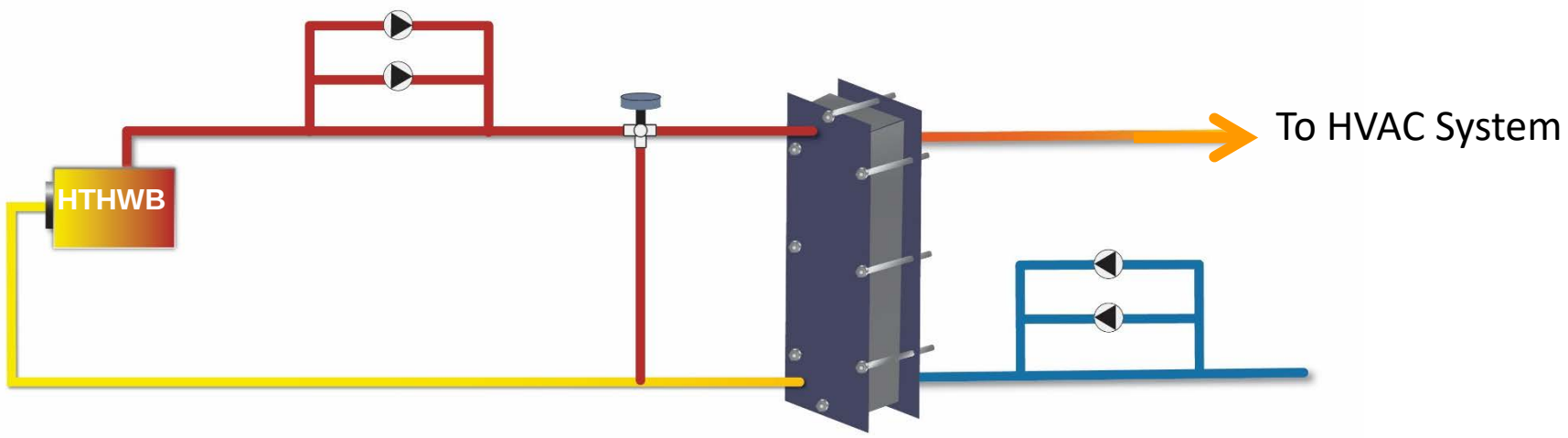
# HYDRONIC HOT WATER VS STEAM

## PRIMARY - SECONDARY LOOP DESIGN

# HYDRONIC VS STEAM

## Primary/Secondary Loop System
## Primary Loop of 35,140,000 BTU/HR

Hydronic Spec for **High Temperature Hot Water System (HTHW)**



# HYDRONIC VS STEAM

## Primary/Secondary Loop System
## Primary Loop of 35,140,000 BTU/HR

Hydronic Spec for High Temperature Hot Water System (HTHW)

**BOILER SCHEDULE - HOT WATER - GAS**

| UNIT NO. | LOCATION | SERVICE | TYPE | BOILER HP | MAXIMUM INPUT MBH | MAXIMUM OUTPUT MBH | FLUID | ENT. WATER TEMP. (DEG. F) | LVG. WATER TEMP. (DEG. F) | MAX WORKING PRESSURE (PSI) | MIN. EFF. REQ. | | BLOWER | | ELEC. CHARACTERISTICS | | | MANUFACTURER & MODEL No. | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | EFF % | TEST PROC. | HP | RPM | VOLTS | HZ | PHASE | BOILER | BURNER | |
| B-1 | MECH RM | HEATING | FLEX TUBE | 525 | 20670 | 17570 | WATER | 165 | 240 | 250 | 85 | DOE | 10 | 3450 | 460 | 60 | 3 | UNILUX AM ZF2000-W-GO | POWERFLAME LNCMR10B-G-30 | 1, 2, 3, 4 |
| B-2 | MECH RM | HEATING | FLEX TUBE | 525 | 20670 | 17570 | WATER | 165 | 240 | 250 | 85 | DOE | 10 | 3450 | 460 | 60 | 3 | UNILUX AM ZF2000-W-GO | POWERFLAME LNCMR10B-G-30 | 1, 2, 3, 4 |
| B-3 | MECH RM | HEATING | FLEX TUBE | 525 | 20670 | 17570 | WATER | 165 | 240 | 250 | 85 | DOE | 10 | 3450 | 460 | 60 | 3 | UNILUX AM ZF2000-W-GO | POWERFLAME LNCMR10B-G-30 | 1, 2, 3, 4 |

REMARKS:
1. BOILER SHALL BE DESIGNED TO 275 DEG.F. AT 250 PSI.
2. BOILER SHALL BE FITTED WITH RELIEF VALVE FOR 250 DEG.F. AND 150 PSI.
3. BOILER SHALL BE FITTED WITH FIELD INSTALLED REAR LADDER TO ACCESS RELIEF VALVES AT TOP OF BOILER.
4. BOILER SHALL BE EQUIPED WITH IFGR PIPING AND BURNER WITH 10" LCD TOUCH SCREEN DISPLAY.

# ENERGY CAPACITY OF WATER vs STEAM

## WATER

1 lb. of water
raised 1°F

**= 1 BTU**

## STEAM

1 lb. of steam at
0 psig that condenses

into 1 lb. of water at 212°F **=**

**970.3 BTU**

# HYDRONIC VS STEAM

GPM & PPH of water for 35,140 MBH

8.33 lbs./gallon of water
60 minutes = 1 hour

## HYDRONIC

Water @ 75°F ΔT

35,140 MBH @ 75 ΔT = 468,533 PPH
468,533 PPH / (8.33 x 60) = 937 GPM

## STEAM

Steam @ 100 PSI

35,140 MBH / 1,019 BTU/lb*. = 34,485 PPH
34,485 PPH / (8.33 x 60) = **69 GPM**

**1,019 BTU/lb is latent plus sensible heat from sub-cooled condensate at 200°F (880 latent + 139 sensible)*

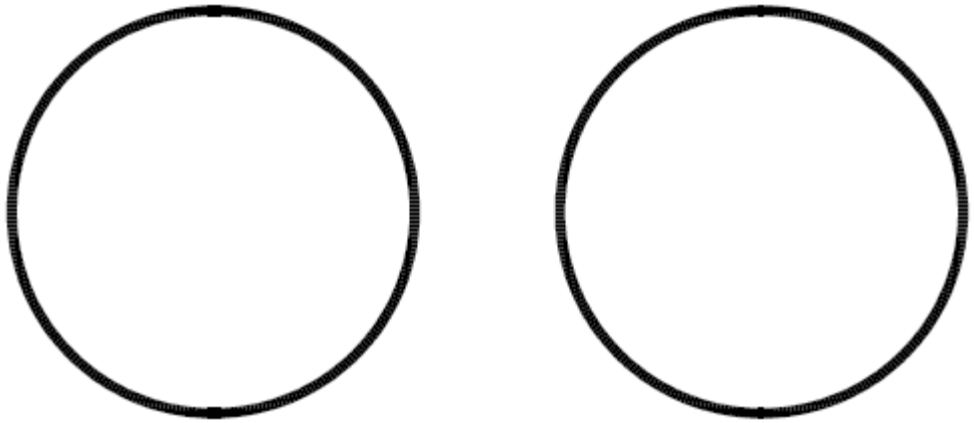
# HYDRONIC VS STEAM

GPM water & PPH steam for 35,140 MBH

## HYDRONIC

Water 937 GPM @ 75°F ΔT

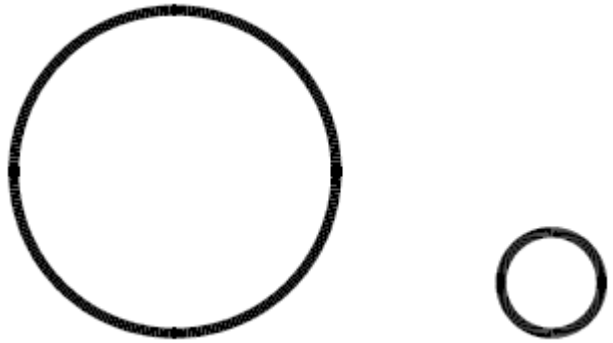
(2) 10” pipes @ 3.8 FPS



## STEAM

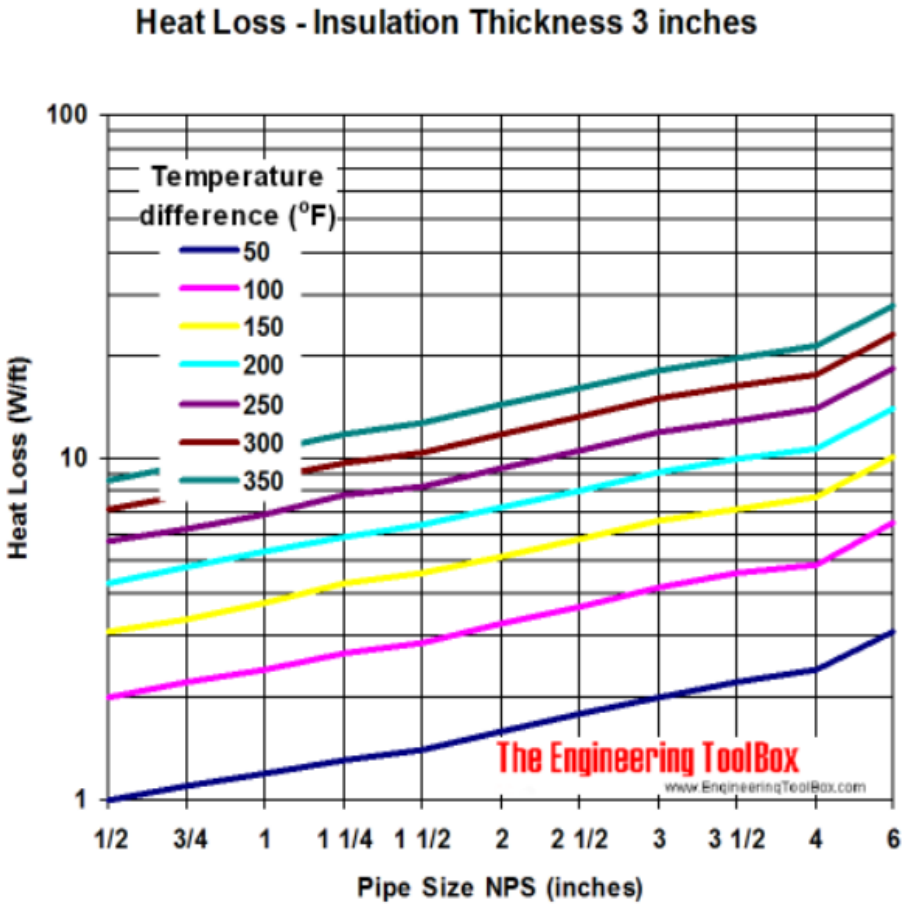
Steam 34,485 PPH @ 100 PSI
Condensate @ 69 GPM

Steam (1) 8” pipe @ 6,419 FPM
Condensate (1) 2.5” pipe @ 4.5 FPS

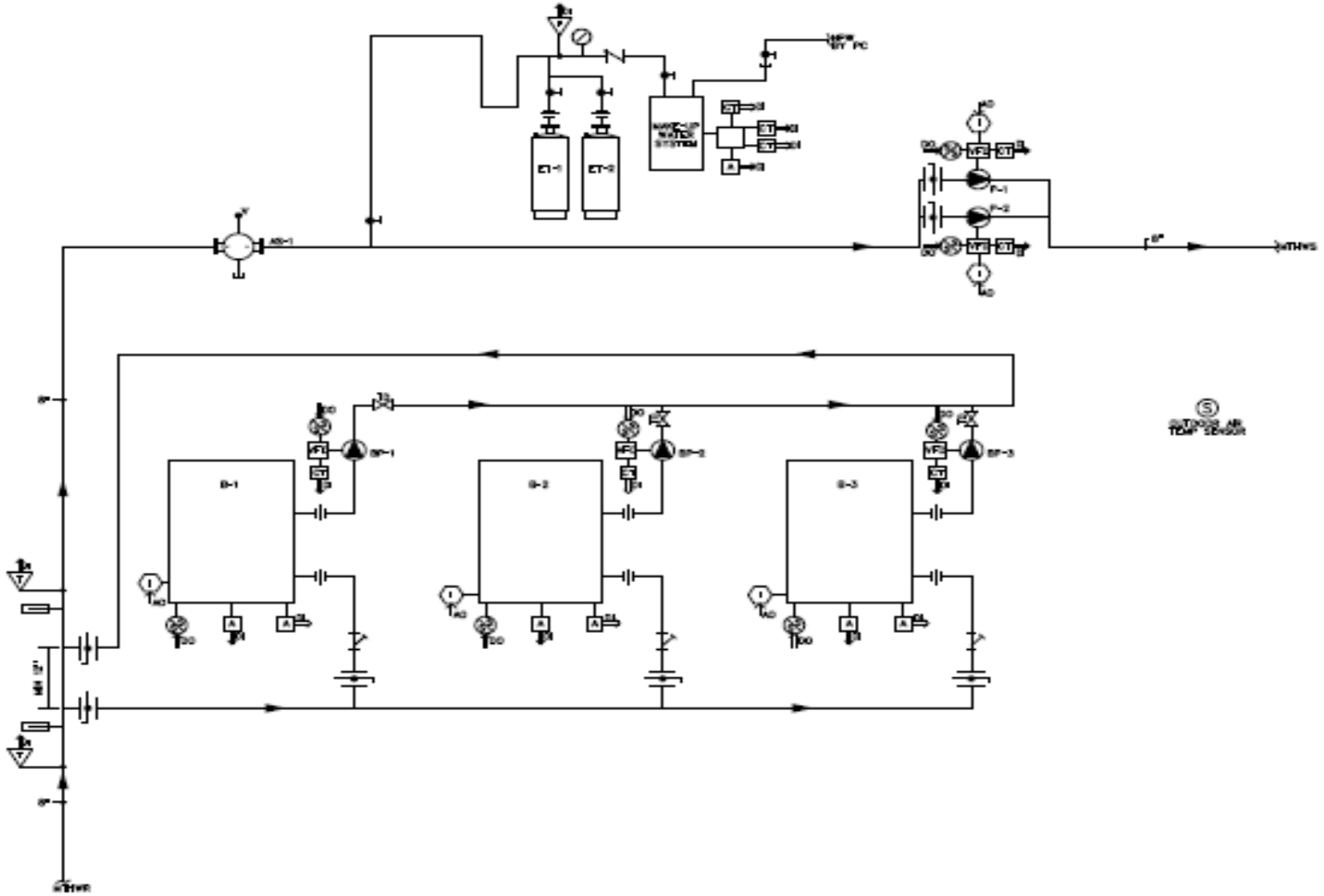


# Condensate piping energy lost

| | | | |
|---|---|---|---|
| Mass Flow (lbs/hr) | 20000 | 20000 | 20000 |
| Inside Temp. (F) | 200 | 150 | 100 |
| Outside Temp. (F) | 70 | 70 | 70 |
| Temperature Diff. (F) | 130 | 80 | 30 |
| Pipe Dia. (in) | 2 | 2 | 2 |
| Pipe Lenght (ft) | 3000 | 3000 | 3000 |
| Insulation Thickness (in) | 3 | 3 | 3 |
| | | | |
| Graph. Heat Loss (W/ft) | 5 | 3 | 1,5 |
| BTU/hr / ft | 17,05 | 10,23 | 5,115 |
| | | | |
| Energy Loss (BTU/hr) | 51150 | 30690 | 15345 |
| Degree (F) from Energy Loss | 2,6 | 1,5 | 0,8 |
| | | | |
| Running Time (hr) | 8700 | 8700 | 8700 |
| Cost per 1000 lbs of Steam ($) | 15 | 15 | 15 |
| Cash Loss from Energy Loss ($) | 6 675,08 $ | 4 005,05 $ | 2 002,52 $ |



# Typical Hydronic System



# 937 GPM Hydronic VS 69 GPM Steam

**PUMP SCHEDULE**

| PUMP NO. | LOCATION | PUMP NAME | SERVICE | UNIT TYPE & DESCRIPTION | PUMP CAPACITY | | MAX WWP | MOTOR CHARACTERISTICS | | | | | IMPELLER SIZE (DIA. In.) | FLUID TEMP. (Deg.F) | MIN. PUMP EFF. (%) | MAX. BHP | SUCTION & DISCHARGE SIZES | TRIPLE DUTY VALVE SIZE | SUCTION DIFFUSER SIZE | MANUFACTURER & MODEL No. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FLOW (GPM) | TOTAL HEAD IN FEET | | RPM | HP | VOLTS | PHASE | STARTER | | | | | | | | | |
| P-1 | MECH ROOM | P-1 | DIST. PUMPS | BASE-HIGH TEMP | 1150 | 160 | 300 | 1800 | 60 | 460 | 3 | ASD | 14.125 | 350 | 75 | 55.9 | 6x4 | 6 | 6 | DEAN PUMP R4180-4X6X15.5 | 2, 3 |
| P-2 | MECH ROOM | P-2 | DIST. PUMPS | BASE-HIGH TEMP | 1150 | 160 | 300 | 1800 | 60 | 460 | 3 | ASD | 14.125 | 350 | 75 | 55.9 | 6x4 | 6 | 6 | DEAN PUMP R4180-4X6X15.5 | 2 |
| CAP-1 | MECH ROOM | CAP-1 | COMB AIR | HORZ INLINE | 34 | 25 | 175 | 1760 | 1/2 | 460 | 3 | COMBO | 5.4 | 240 | 52 | .41 | 1.5x1.5 | 2 | - | TACO 1915 - SEALIDE C SEAL | 3 |
| BP-1 | MECH ROOM | BP-1 | BOILER LOOP | BASE-HIGHTEMP AC | 700 | 45 | 300 | 1800 | 15 | 460 | 3 | ASD | 8.5 | 350 | 81 | 14.2 | 6x4 | 6 | 6 | DEAN PUMP RWA 4166 4x6x10 •2 | 1, 3 |
| BP-2 | MECH ROOM | BP-2 | BOILER LOOP | BASE-HIGH TEMP AC | 700 | 45 | 300 | 1800 | 15 | 460 | 3 | ASD | 8.5 | 350 | 81 | 14.2 | 6x4 | 6 | 6 | DEAN PUMP RWA 4166 4x6x10 •2 | 1 |
| BP-3 | MECH ROOM | BP-3 | BOILER LOOP | BASE-HIGH TEMP AC | 700 | 45 | 300 | 1800 | 15 | 460 | 3 | ASD | 8.5 | 350 | 81 | 14.2 | 6x4 | 6 | 6 | DEAN PUMP RWA 4166 4x6x10 •2 | 1 |
| CHWP-1 | MECH ROOM | CHWP-1 | CHILLED WATER | BASEMOUNT | 1730 | 90 | 125 | 1750 | 50 | 460 | 3 | ASD | 10.64 | 60 | 84 | 45 | 8x6 | 6 | 8 | TACO FI6011 | 3 |
| CHWP-2 | MECH ROOM | CHWP-2 | CHILLED WATER | BASEMOUNT | 1730 | 90 | 125 | 1750 | 50 | 460 | 3 | ASD | 10.64 | 60 | 84 | 45 | 8x6 | 6 | 8 | TACO FI6011 | |
| CP-1 | MECH ROOM | CP-1 | CHILLER 1 | INLINE | 865 | 25 | 125 | 1160 | 10 | 460 | 3 | ASD | 8.25 | 60 | 80 | 6.8 | 8x8 | 8 | - | TACO KS8011 | 3 |
| CP-2 | MECH ROOM | CP-2 | CHILLER 2 | INLINE | 865 | 25 | 125 | 1160 | 10 | 460 | 3 | ASD | 8.25 | 60 | 80 | 6.8 | 8x8 | 8 | - | TACO KS8011 | |

REMARKS:

1. FAN COOLED, HORIZONTAL, SINGLE STAGE, END SUCTION, ENCLOSED IMPELLER, CENTRIFUGAL, HIGH TEMPERATURE HOT WATER PUMP.
2. WATER COOLED OIL BEARING, HORIZONTAL, SINGLE STAGE, END SUCTION, ENCLOSED IMPELLER, CENTRIFUGAL, HIGH TEMPERATURE HOT WATER PUMP.
3. PROVIDE SPARE SEAL KIT WITH PUMP



Two Boiler Pumps 15 HP Each
System Pump 60 HP
Total Pumping 90 HP



**90 HP**

**15 HP**

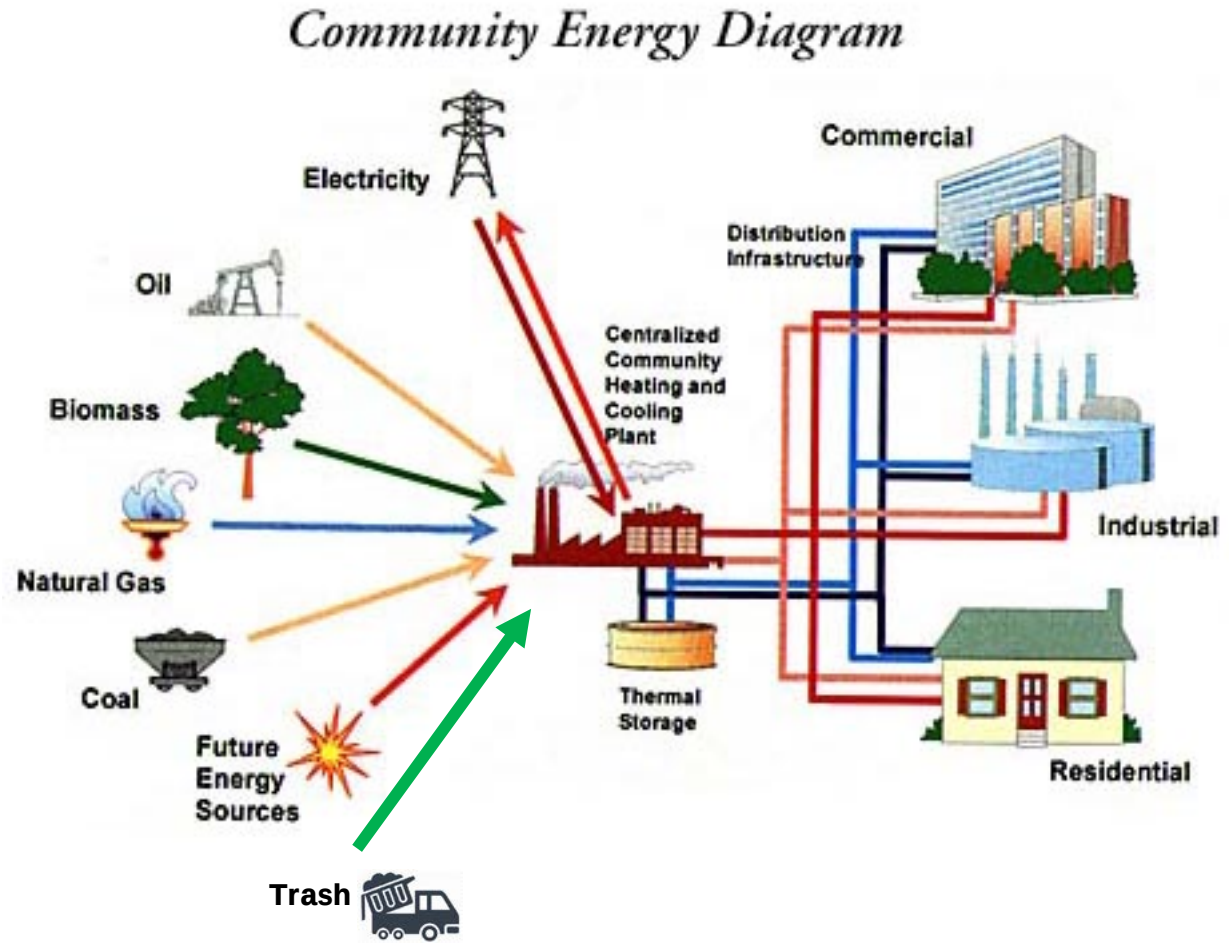
***The pumps represent 3% of the overall energy needed for the hydronic loop***


TOP 5 REASONS TO
CONSIDER STEAM

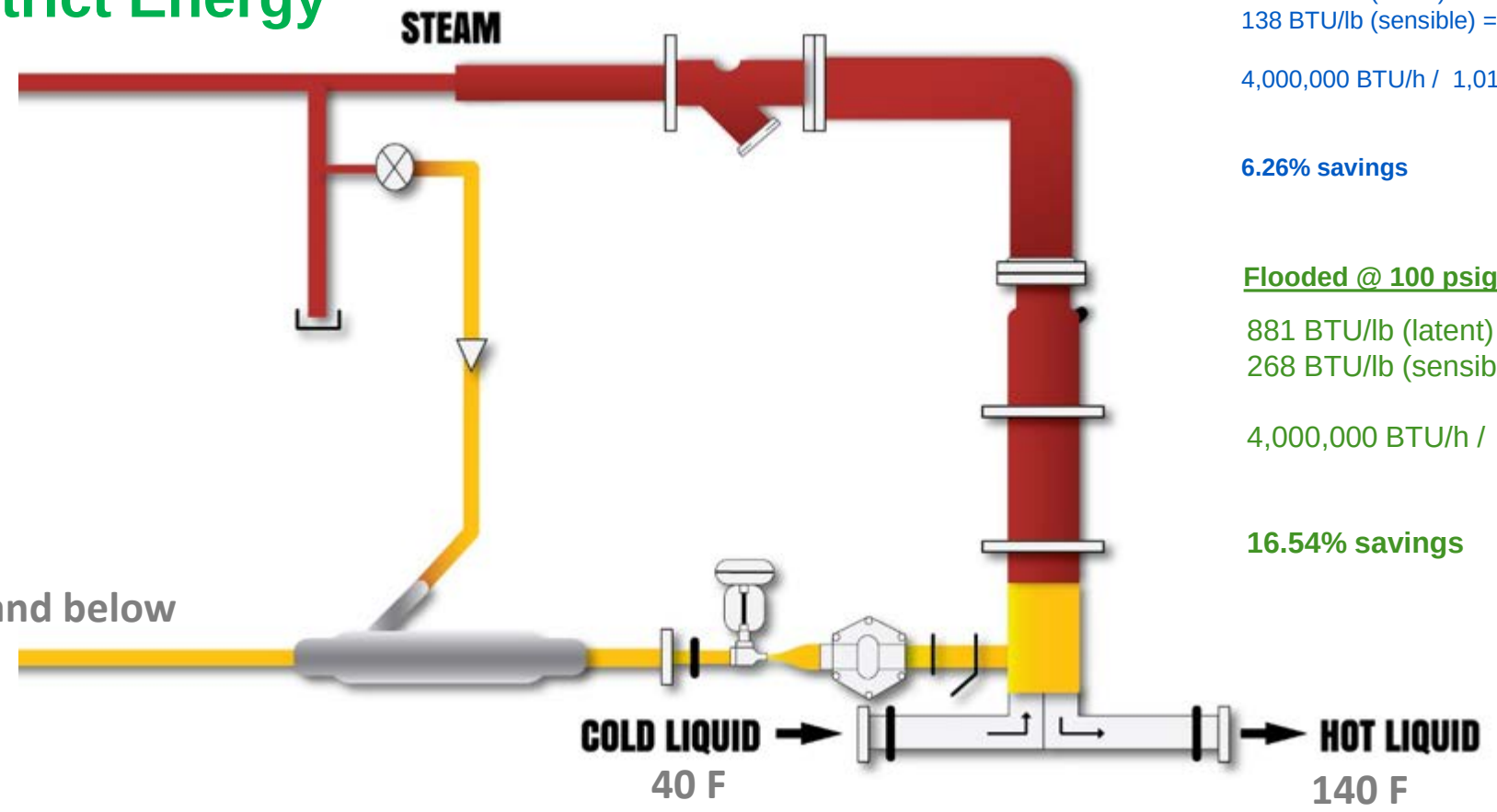
# # 1 reason

No vents & No chimney, really?

# District Energy



# District Energy




**Conventional @ 6 psig**

4,000,000 BTU/h / 959 BTU/lb = 4,171 lbs/h

**Flooded @ 100 psig w/ 200F condensate outlet**

881 BTU/lb (latent) +
138 BTU/lb (sensible) = 1,019 BTU/lb total heat

4,000,000 BTU/h / 1,019 BTU/lb = 3,925 lbs/h

**6.26% savings**

**Flooded @ 100 psig w/ 70F condensate outlet**

881 BTU/lb (latent) +
268 BTU/lb (sensible) = 1,149 BTU/lb total heat

4,000,000 BTU/h / 1,149 BTU/lb = 3,481 lbs/h

**16.54% savings**

# 30+ cities that have central steam

- New-York
- Seattle
- Philadelphia
- Boston
- Baltimore
- Washington DC
- Hartford
- Buffalo
- Rochester
- Minneapolis
- Milwaukee
- Denver
- Montreal
- Vancouver
- Pittsburg
- Saint-Louis
- Tulsa
- Kansas City
- San Fransisco
- New Orleans
- Detroit
- Cambridge
- Los Angeles
- Houston
- Cambridge
- Austin
- Richmond
- San Diego
- Grand Rapids
- Cleveland


WESTERN WASHINGTON UNIVERSITY
1893
Duke
UNIVERSITY
VE RI TAS
HARVARD
UNIVERSITY
PENNSTATE
1855
THE UNIVERSITY OF
CHICAGO
COLORADO SCHOOL OF MINES
OFFICIAL SEAL
1874
TOWSON
UNIVERSITY
GRAND VALLEY
STATE UNIVERSITY
University of
Connecticut
MONTCLAIR STATE UNIVERSITY
THE UNIVERSITY OF
TENNESSEE
KNOXVILLE
University
of Colorado
Denver
Yale
UNIVERSITY
Penn
THE UNIVERSITY of
NEW MEXICO





















conEdison, inc.





















# # 2 reason

No acid contamination

# Condensing hydronic boiler risk

Nearly 1 gallon per hour for 30 kw (120,000 btu) input



Dumping condensate to drain is way
less damaging
than dumping acid.

# # 3 reason

# Advantageous Life Cycle Cost




No burner.
No gas train.
No vent, no chimney.
No need to have a certified gas technician in order to fix the unit.
Pipe fitter, plumber, electrician or control specialist can manage repairs on the heat exchanger.



# # 4 reason

Generating Electric Power



# # 5 reason

Steam is safe and reliable


ROYAL FARMS ARENA
ONE
DO N
ENT
STEAM PLANT GRILL

# Steam Training Invitation



April 19-21, 2023
October 4-6, 2023
November 1-3, 2023

**maxi-therm.net/our-training**

De-Carbonizing the Campus: Planning, Tools & Technologies
CampusEnergy2023
February 27 – March 2, 2023
Gaylord Texan Resort & Convention Center | Grapevine, Texas

**BOOTH #100**

2023 PDC SUMMIT
March 12-15 Phoenix

**BOOTH #1010**

IDEA2023
Empowering the Next Generation
June 5-8 | Hilton Chicago | Chicago, IL

**BOOTH #TBD**

# Steam is our passion

De-Carbonizing the Campus: Planning, Tools & Technologies

## CampusEnergy2023

February 27 – March 2, 2023

Gaylord Texan Resort & Convention Center | Grapevine, Texas

**BOOTH #100**

**My upcoming trips**

February 13-14 in Milwaukee WI

February 15-16 in Minneapolis MN

February 20 in Chicago

February 27 in Grapevine TX

March 13 in Phoenix AZ

April –May: Florida, Louisiana, Alberta and Boston

June 5 in Chicago at **IDEA**

patrick@maxi-therm.net

## Steam Training Invitation



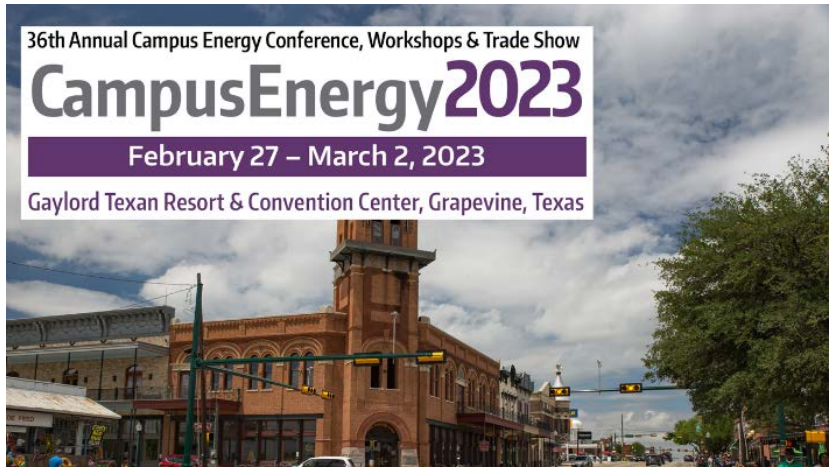
April 20-21, 2023

October 5-6, 2023

November 2-3, 2023

**maxi-therm.net/our-training**

# What's Next at IDEA?




**CampusEnergy2023** is one month away – register before February 17 and save up to $300 at https://bit.ly/Campus23IDEA-Reg.

Visit https://www.districtenergy.org/campusenergy2023/home for details on speakers, sessions, booking your hotel and more.

We expect over 1000 attendees – if you're not yet registered, please do so ASAP.

## Upcoming I&I Webinar – Feb 1, 2023

*Prepare your District Energy System for Artificial Intelligence Integration*

Join IDEA and Phaidra for our next I&I webinar, featuring a glimpse into the future and learn how to prepare for Artificial Intelligence (AI) in district energy *systems*.

Learn more and register to attend this free webinar at https://bit.ly/IDEA-Phaidra

## IDEA2023 114th Annual Conference

We're getting ready for IDEA2023, taking place in Chicago, Illinois, from June 5-8 at the Chicago Hilton.

We're anticipating an international gathering in Chicago to meet under the theme "Empowering the Next Generation". Registration will open soon!

Stay connected at:
https://www.districtenergy.org/idea2023/home