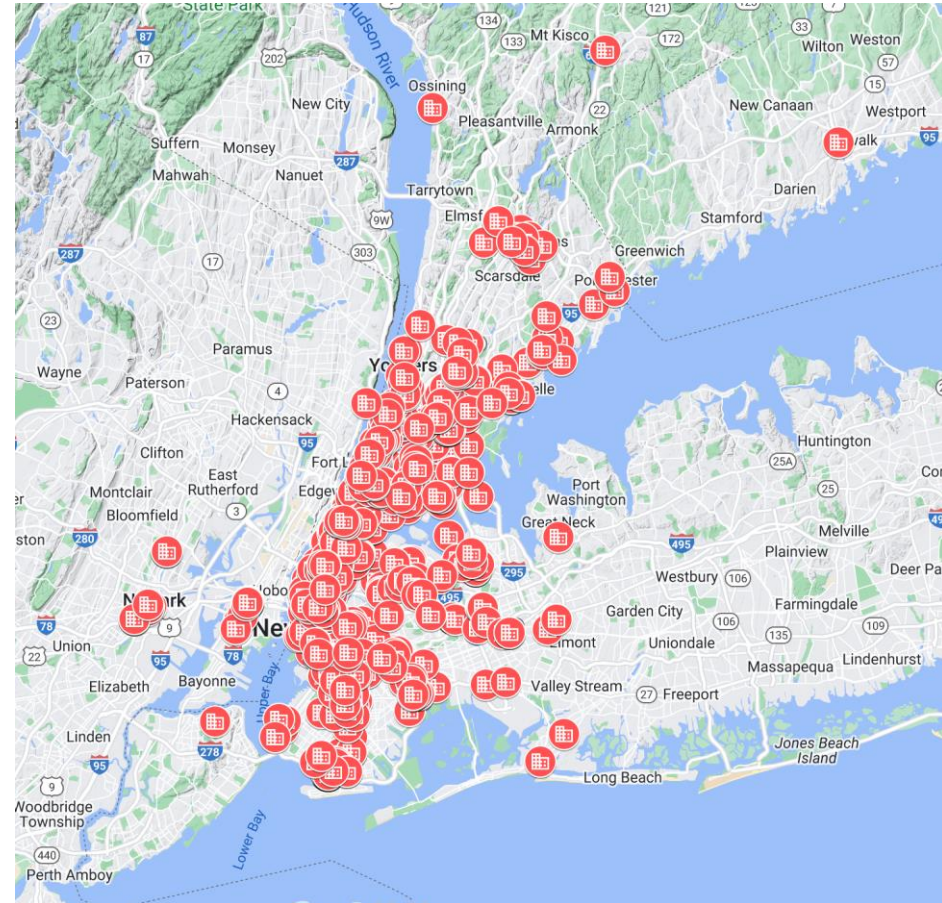


Haystack Connect
Smart Data. Smart Devices. Smart Buildings. Smart Business.

ABOUT US

- Started the company in 2012
- Customer base is NYC metro area
- Controls and monitoring for 200+ heating plants (10mm sqft)
- Service 600+ heating plants
- 100 active mechanical installation projects
- 1,000+ NYC buildings served to date
- 80 Employees



Integrated Energy Services

Maximize Comfort, Minimize Costs, Increase NOI



Service, Installation, & Compliance

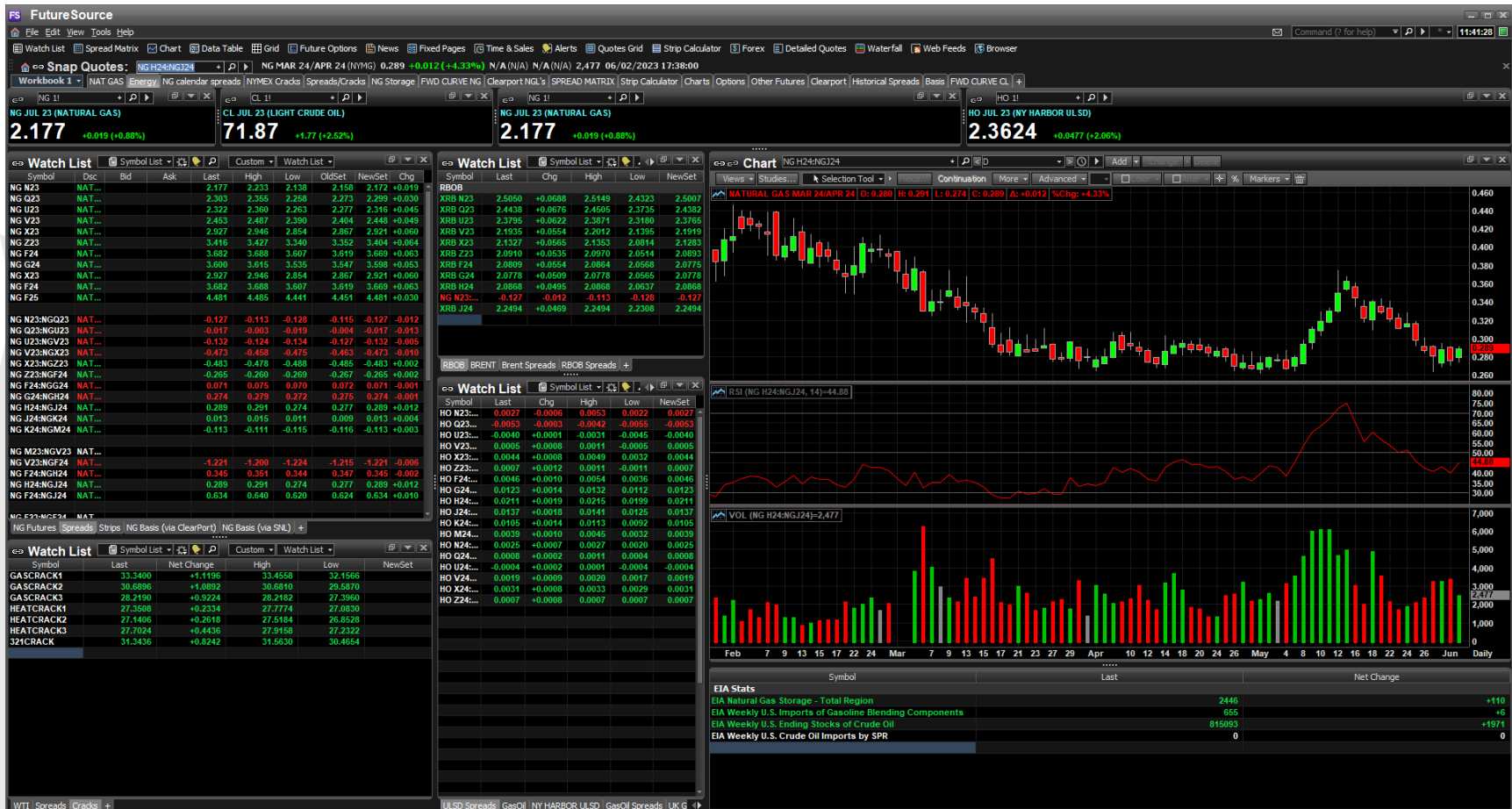
- 24 Hour Emergency Service
- Boilers, Burners, Water Heaters
- Oil to Gas Conversions, CHP
- Triennial, BO-9, Backflow Filings.



Real Time Energy Management

- Monitor & Control - fault detection, reliability, efficiency
- Preventative & Proactive Service
- Demand Management & Load Shifting
- Energy supply risk management

ENERGY MARKETS ARE MY PARADIGM



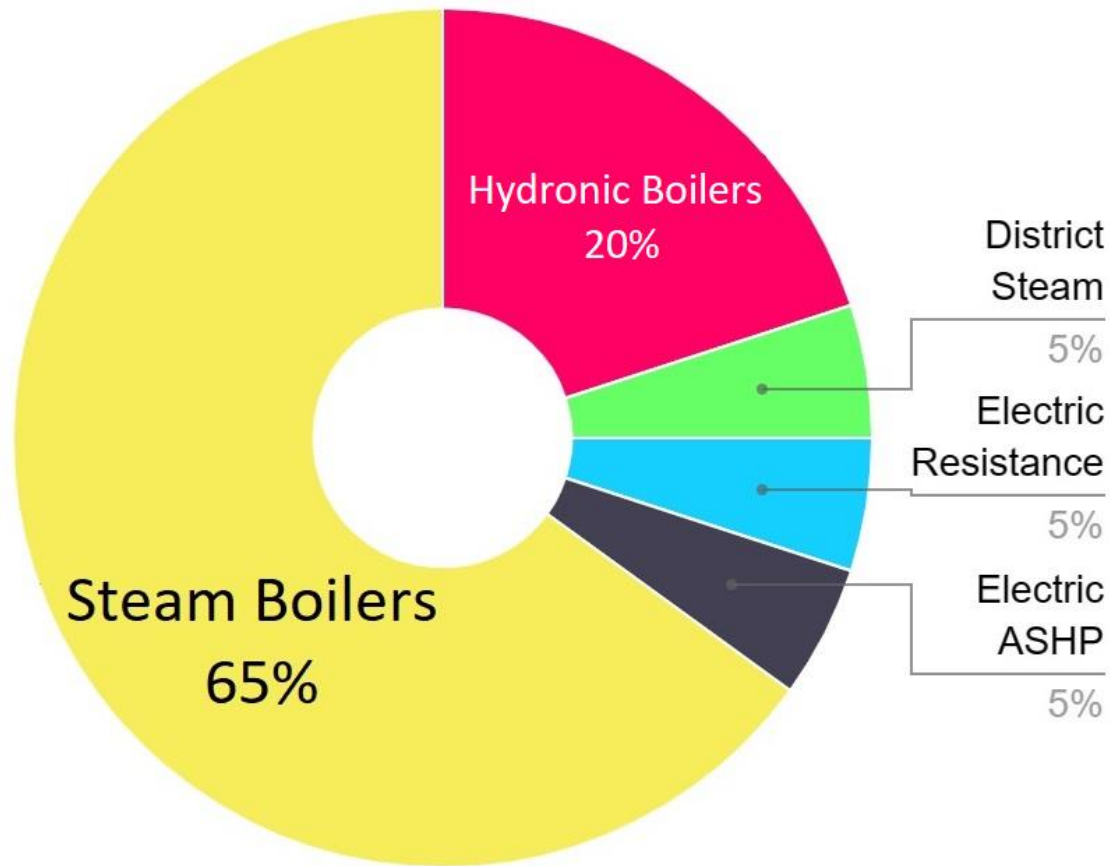


OUR BUILT ENVIRONMENT...

HEATING SYSTEMS ARE 80% OF A COMMON AREA ENERGY SPEND



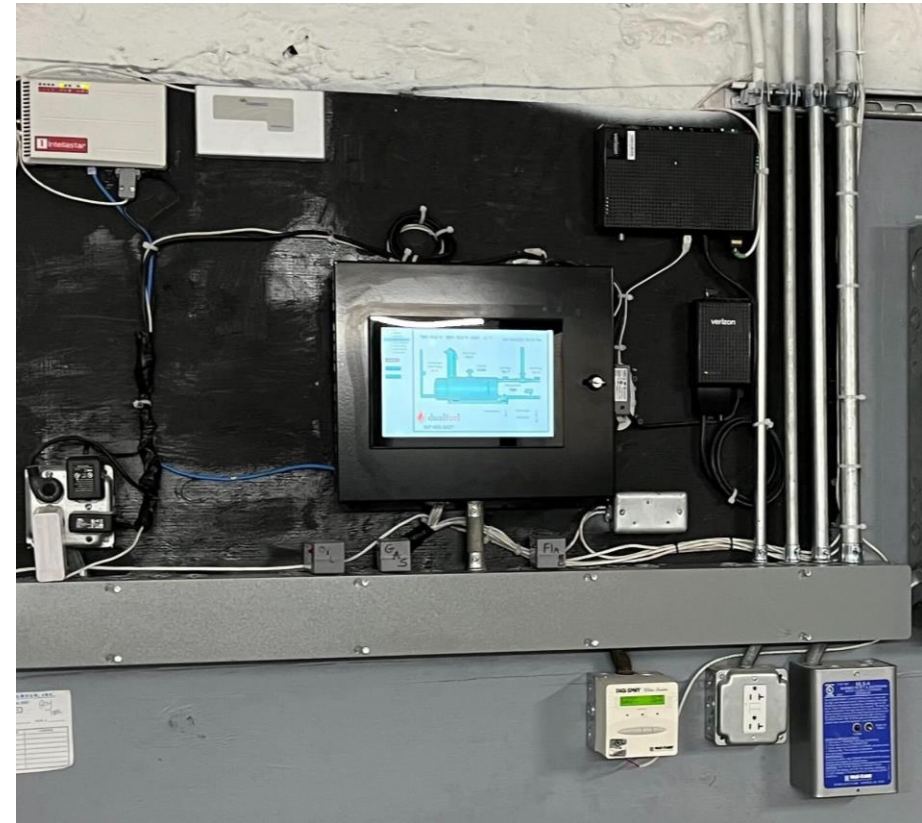
NYC HEATING MARKET (ROUGH #'S)



OPEN WINDOWS AND OVERHEATING IS VERY COMMON



AXXON = CLOSED WINDOWS = 20% REDUCTION



STEEL GIRDERS BUILT ON HAYSTACK



AXXON COULD NOT EXIST WITHOUT HAYSTACK



SkySpark
EVERYWHERE

- Building our own graphics and analytics would have been time consuming and costly from a programming perspective
- We bootstrapped Axxon in 2017 with only 1 FTE
- Enormous amount of time (\$) would have been wasted on how meta data should be tagged and labeled

TAGS ARE CRUCIAL TO OUR OPERATIONS

- 15,000 points
- 205 sites
- Graphics
 - 2 views!
- Analytics
 - 6 spark views
 - 3 KPI views
 - 4 “heat” views
- Haystack compliance:
 - nonCompliantTags: 40656,
 - percentageCompliant: 71.27%,
 - totalTagCount: 141495,
 - totalPointCount: 14282,
 - compliantTags: 100839

nyc, singleSteamBoiler, site	
id	p:dualfuel:r:2b4f488f-e4964221
boilerAppTemplate	singleSteamBoiler
boilerCount	1
conns	{haystack:[p:dualfuel:r:2b4f3ef9-35a9c81f], sedona:[p:dualfuel:r:2b4f3f66-d245012c]}
created	9-Jan-2023 Mon 4:50:07PM EST
dis	804 W 180th Street
geoAddr	804 W 180th Street
geoCountry	US
geoState	NY
geoStreet	804 W 180th Street
graphicId	Site
haystackConnRef	Haystack Conn - 804 W 180th Street
isp	Verizon
primaryFunction	Multifamily Housing
regionDis	Pride Property Management
serviceContract	2023
shortName	804 W 180th Street
syncGroupNum	10
tz	New_York
weatherStationRef	Central Park
zoneCount	1
mod	4-Jun-2023 Sun 4:00:17AM UTC

804 W 180th Street	
Boiler Plant	
Apartment Sensors	
Apt 5	Haystack Conn - 804 W 180th Street
Apt 21	Haystack Conn - 804 W 180th Street
Apt 33	Haystack Conn - 804 W 180th Street
Apt 36	Haystack Conn - 804 W 180th Street
Apt 47	Haystack Conn - 804 W 180th Street
Apt 54	Haystack Conn - 804 W 180th Street
Apt 55	Haystack Conn - 804 W 180th Street
Apt 61	Haystack Conn - 804 W 180th Street
Apt 62	Haystack Conn - 804 W 180th Street
Apt 63	Haystack Conn - 804 W 180th Street
Apt 66	Haystack Conn - 804 W 180th Street
Axon Control Panel	
Boiler	
Burner	
Burner Command	Haystack Conn - 804 W 180th Street
Burner Status	Haystack Conn - 804 W 180th Street
Flame Failure Alarm	Haystack Conn - 804 W 180th Street
Gas	Haystack Conn - 804 W 180th Street
Oil	Haystack Conn - 804 W 180th Street
Condensate Pipe	
Condensate Return Temperature	Haystack Conn - 804 W 180th Street
Domestic Hot Water Mixing Valve	
Domestic Hot Water Temperature	Haystack Conn - 804 W 180th Street
Hot Water Coil Temperature	Haystack Conn - 804 W 180th Street
Flue Duct	
Stack Temperature	Haystack Conn - 804 W 180th Street
Makeup Line	
Makeup Water	Haystack Conn - 804 W 180th Street
Steam Header	
Steam Pressure	Haystack Conn - 804 W 180th Street

SAMPLE HEATING PLANT DATA MODEL

Dual Fuel
Site
App
Tag
View

New Site
New Child
Search...

Total Realty

1010 Sherman Avenue

Boiler Plant

Apartment Sensors

Axxon Control Panel

Heat Controls

Heat Timer

Indoor Air Thermostat

Daytime Setpoint

EBT Bypass

Effective Building Temperature

Excluded Apts

Freeze Boost Status

Indoor Air Enable Status

Nighttime Setpoint

Outlier Apts

Target Building Temperature

Outside Air Thermostat

Call for Heat

Morning Boost Enable

Season

Season

Hot Water Controls

Override

Boiler Status

Bypass Status

Controller Current Hour

Haystack Online Status

Sedona Online Status

System Status

Boiler

Burner

Aquastat Temperature

Condensate Pipe

Condensate Return Temperature

Domestic Hot Water Mixing Valve

Domestic Hot Water Temperature

Hot Water Coil Temperature

Flue Duct

Stack Temperature

Makeup Line

Makeup Water

Steam Header

Steam Pressure

Meters

1A

1B



WELCOME TO AXXON

VALUE OF DATA IS LIMITED TO YOUR ABILITY TO ACT ON IT!

Proactive Service



Remote diagnostics provides cause of system outages

Technicians come better prepared

Outages are resolved faster

Reactive Service





USING HAYSTACK TO INCREASE OPERATIONAL EFFICIENCIES IN MECHANICAL CONTRACTING

IF A CUSTOMER LOGS INTO AXxon WE HAVE ALREADY FAILED

- Initially I built Axxon as a customer facing product
- Over time I realized that my primary customer was NOT the building owner but it was my staff
- If we have the data, we must know about customer issues and inefficiencies BEFORE they call our office!
 - Installations department- make it easy for the PMs to do trend based commissioning of new equipment start ups
 - Service department- make it easy for my service team to get ahead of comfort issues before they become problems
 - Energy management- make it easy for my energy management team to identify opportunities to reduce energy spend
 - Mechanical issues (short cycling, high stack temp, makeup water losses, steam balancing etc.
 - Control issues (setpoints too high or placed on “manual”)
 - Energy strategies (i.e. demand response, fuel selection)

ALARMS

- Haystack tags are utilized to direct information to the right departments and the most appropriate personnel
- Comfort alarms (flame failures, DHW, low indoor temps) are directed to: CSRs, Service Manager, Field Supervisor and Dispatcher
- Controls alarms (connectivity, glitches, faulty sensors, system in manual/bypass) are directed to our controls monitoring team

STACK

ALARMS

TILES

LIST

ACK ALL ON CURRENT PAGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:48 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 02:21 pm

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:47 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 03:31 pm

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:44 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 02:17 pm

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:39 pm [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 12:39 pm

PRIORITY

:

1

Instructions: Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. If assistance is needed, please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:30 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 12:30 am

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:30 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 03:14 pm

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Heat Loop Pump 2

Jun 04, 2023 12:21 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 03:09 pm

PRIORITY

:

255

Instructions: 1. Verify that Intellastar device has power. 2. Verify that Intellastar device ethernet cable is securely connected to switch. 3. Cycle power to Intellastar device, leaving device off for 10 minutes. 4. For service, call the Dual Fuel Corp 24 hour service line at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Axxon Control Panel

Jun 04, 2023 12:16 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:16 am

PRIORITY

:

1

Instructions: 1. Verify that Intellastar device has power. 2. Verify that Intellastar device ethernet cable is securely connected to switch. 3. Cycle power to Intellastar device, leaving device off for 10 minutes. 4. For service, call the Dual Fuel Corp 24 hour service line at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:15 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 06:33 am

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

ACKNOWLEDGE

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

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DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

4

Instructions: Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

DOMESTIC HOT WATER TEMPERAT...

Indoor Air Thermostat

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 06:05 am

PRIORITY

:

4

Instructions: Check T-Star jobs and ebypass point details...

DOMESTIC HOT WATER TEMPERAT...

Axxon Control Panel

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

1

Instructions: 1. Verify that all panel devices have active internet connection. Contact ISP if unsure. 2. Cycle power to control panel devices, as well as any downstream routers and/or modems. 4. For service, call the Dual Fuel Corp 24 hour service line at 347-669-2427 ext. 9...

DOMESTIC HOT WATER TEMPERAT...

Boiler 2

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

255

Instructions: 1. Flush low water cutoff to eliminate any sediment. 2. Fill boiler either manually or with automatic feed system. 3. Reset manual reset low water cutoff switch, if applicable. For assistance, call Dual Fuel...

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Normal

LAST IN ALARM

:

Jun 04, 2023 09:32 am

PRIORITY

:

5

Instructions: Potential scalding issue exists. Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

DOMESTIC HOT WATER TEMPERAT...

Indoor Air Thermostat

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

4

Instructions: Check T-Star jobs and ebypass point details...

DOMESTIC HOT WATER TEMPERAT...

Axxon Control Panel

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

1

Instructions: 1. Verify that Intellastar device has power. 2. Verify that Intellastar device ethernet cable is securely connected to switch. 3. Cycle power to Intellastar device, leaving device off for 10 minutes. 4. For service, call the Dual Fuel Corp 24 hour service line at 347-669-2427 ext. 9...

DOMESTIC HOT WATER TEMPERAT...

Domestic Hot Water Mixing Valve

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

PRIORITY

:

1

Instructions: Please check the mixing valve operation and insure that it is set to a value between 120°F-130°F. If assistance is needed, please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

DOMESTIC HOT WATER TEMPERAT...

Avenue Domestic Hot Water Mixing Valve

Jun 04, 2023 12:00 am [NEW YORK]

ALARM STATUS

:

Alarm

LAST IN ALARM

:

Jun 04, 2023 12:00 am

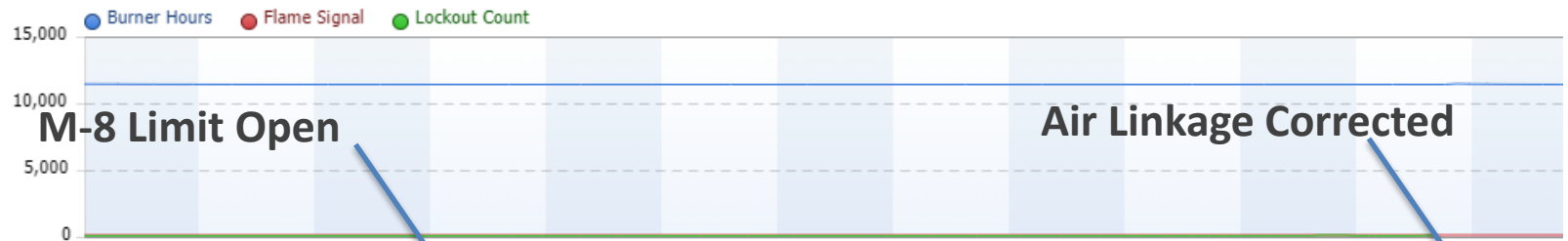
PRIORITY

:

4

Instructions: Please call Dual Fuel 24 Hour Emergency Service at 347-669-2427 ext. 9...

REMOTE DIAGNOSTICS → EFFICIENT LABOR



LOCKOUT FLAME FAIL (AUTO)
 LOCKOUT FLAME FAIL - MTFI
 LOCKOUT M-8 LIMIT OPEN
 FLAME SIGNAL - AUTO
 FLAME SIGNAL - PTFI
 HIGH FIRE PURGE
 L1-3 OPEN

LOCKOUT STATUS

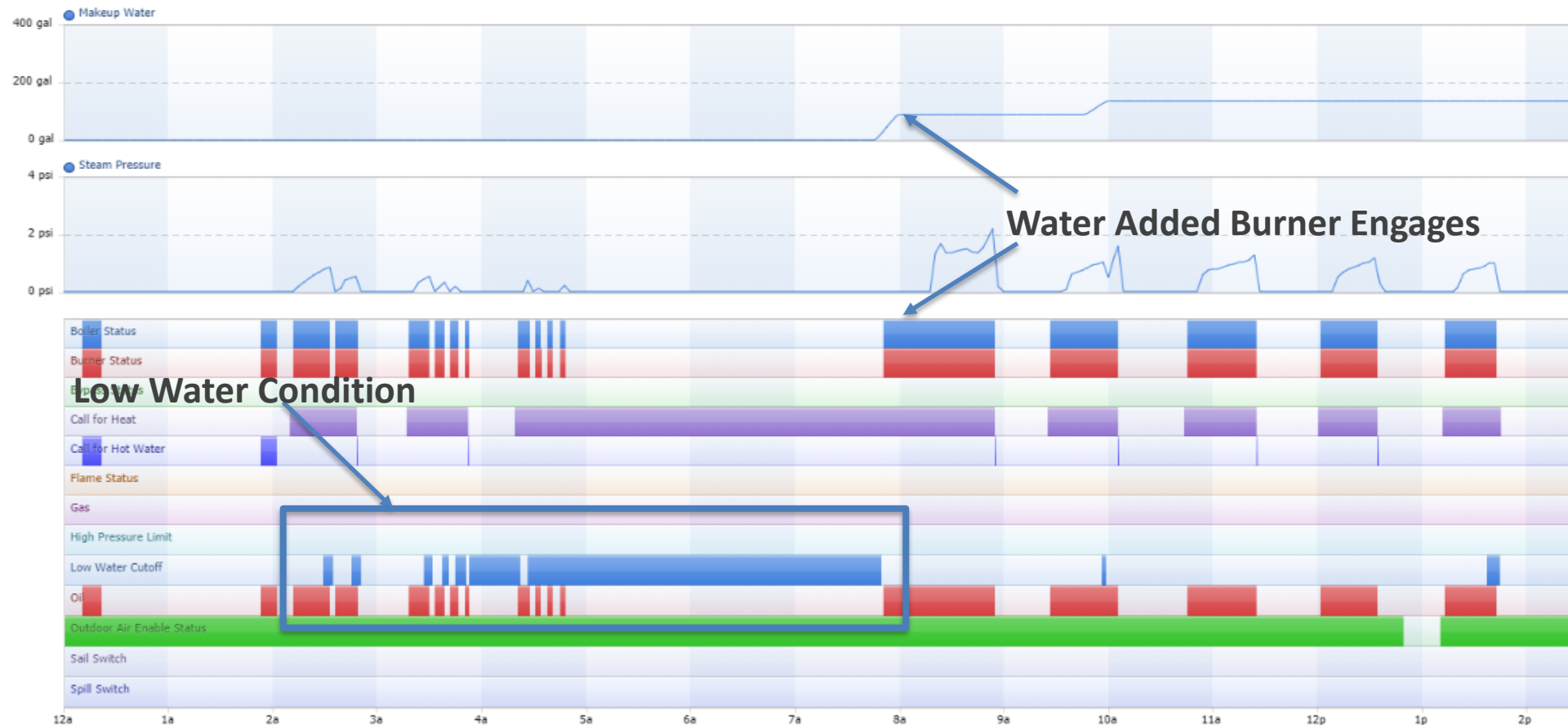
OK

LOGSTAT

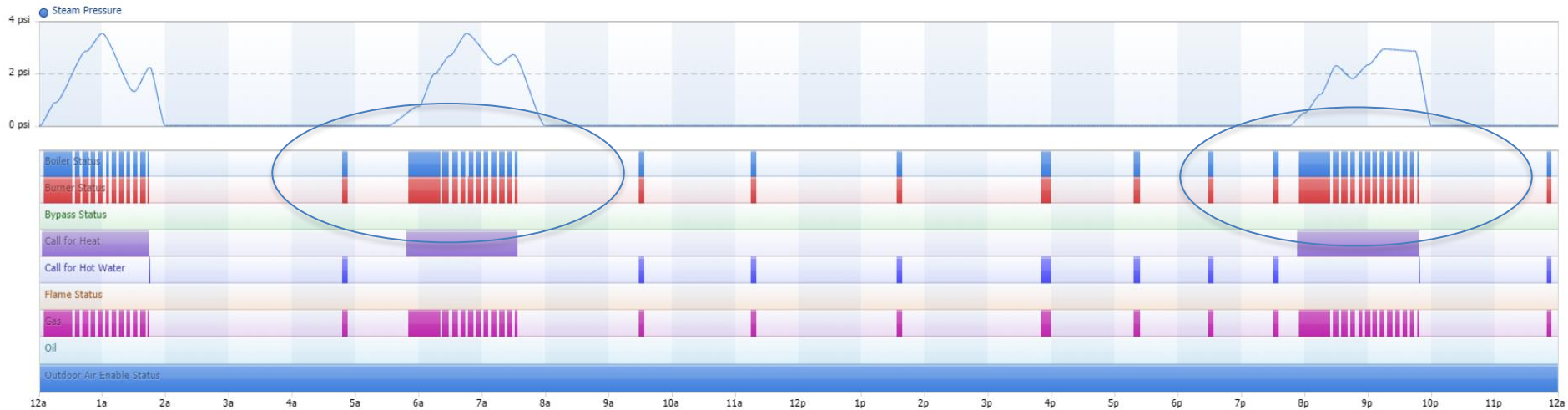
BLOWER ON
 POSTPURGE
 AUTO
 MTFI
 PTFI
 Low Fire Purge
 PURGE
 STANDBY

12a 1a 2a 3a 4a 5a 6a 7a 8a 9a 10a 11a 12p

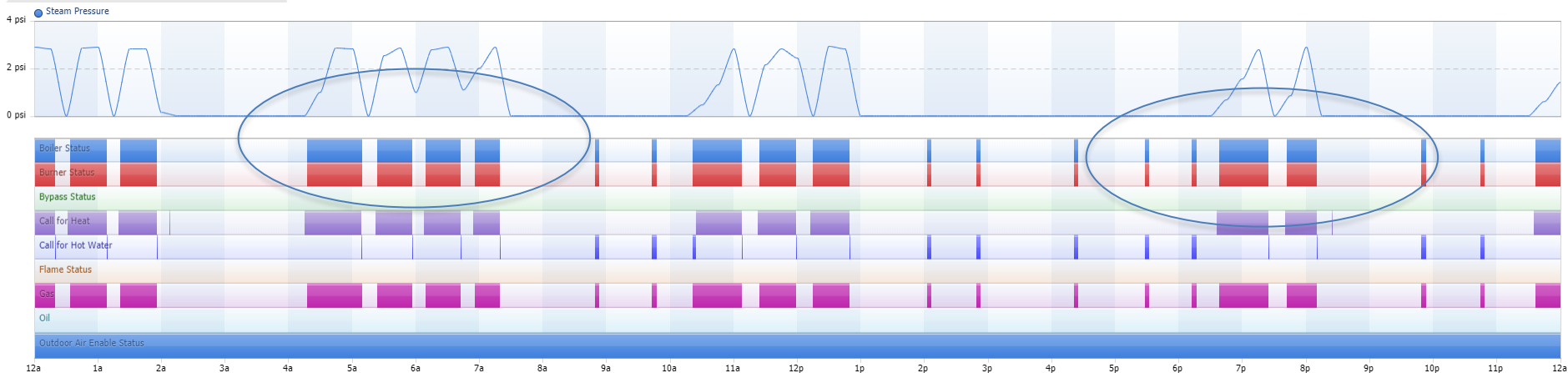
DIGITIZATION OF SAFETY LIMITS → REMOTE SERVICE



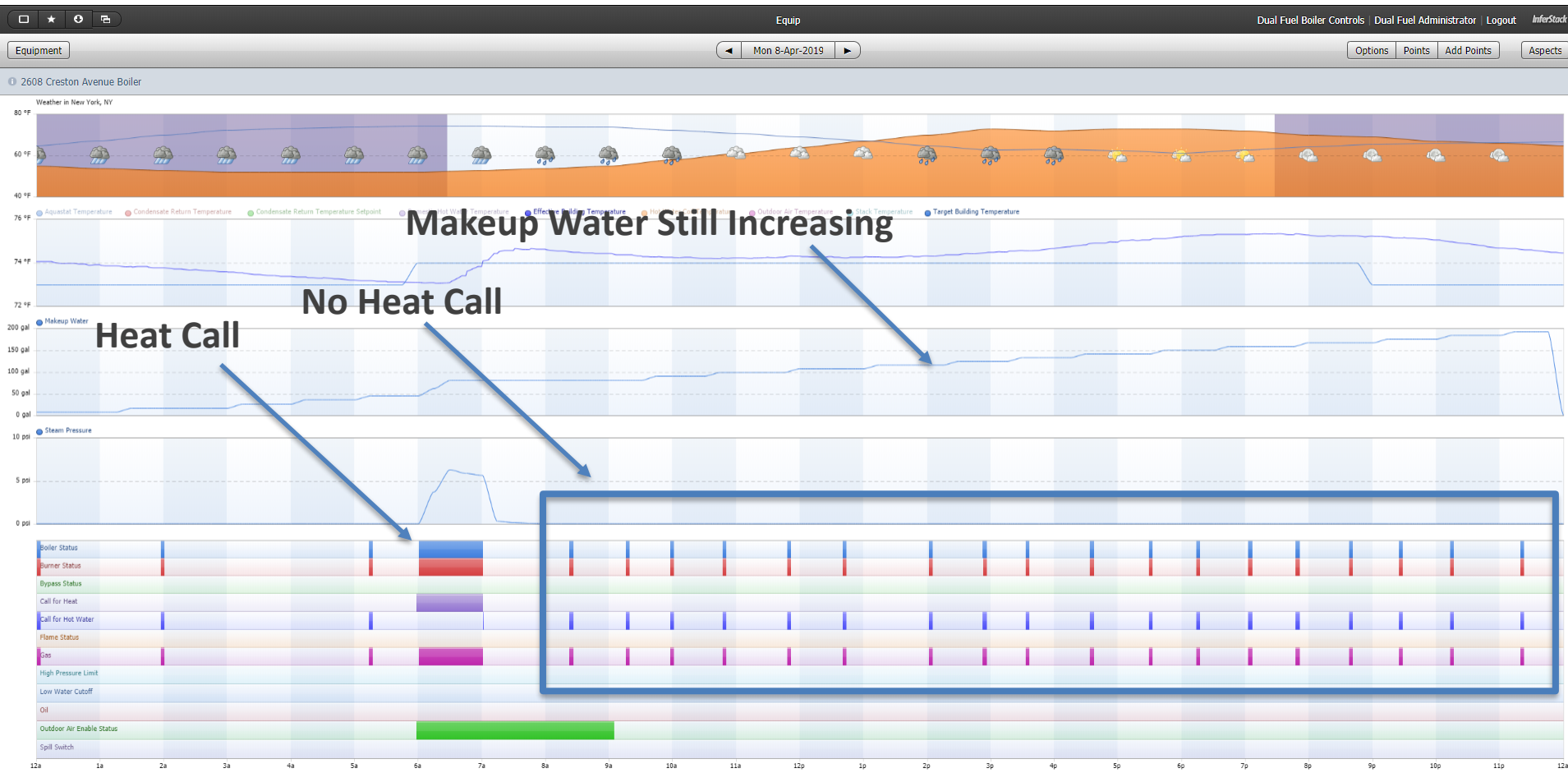
RESOLVING SHORT CYCLING = 3% GAIN



VS.



ANALYTICS DEFINE LEAKING VESSELS = \$12,000 REPAIR





CASE STUDIES

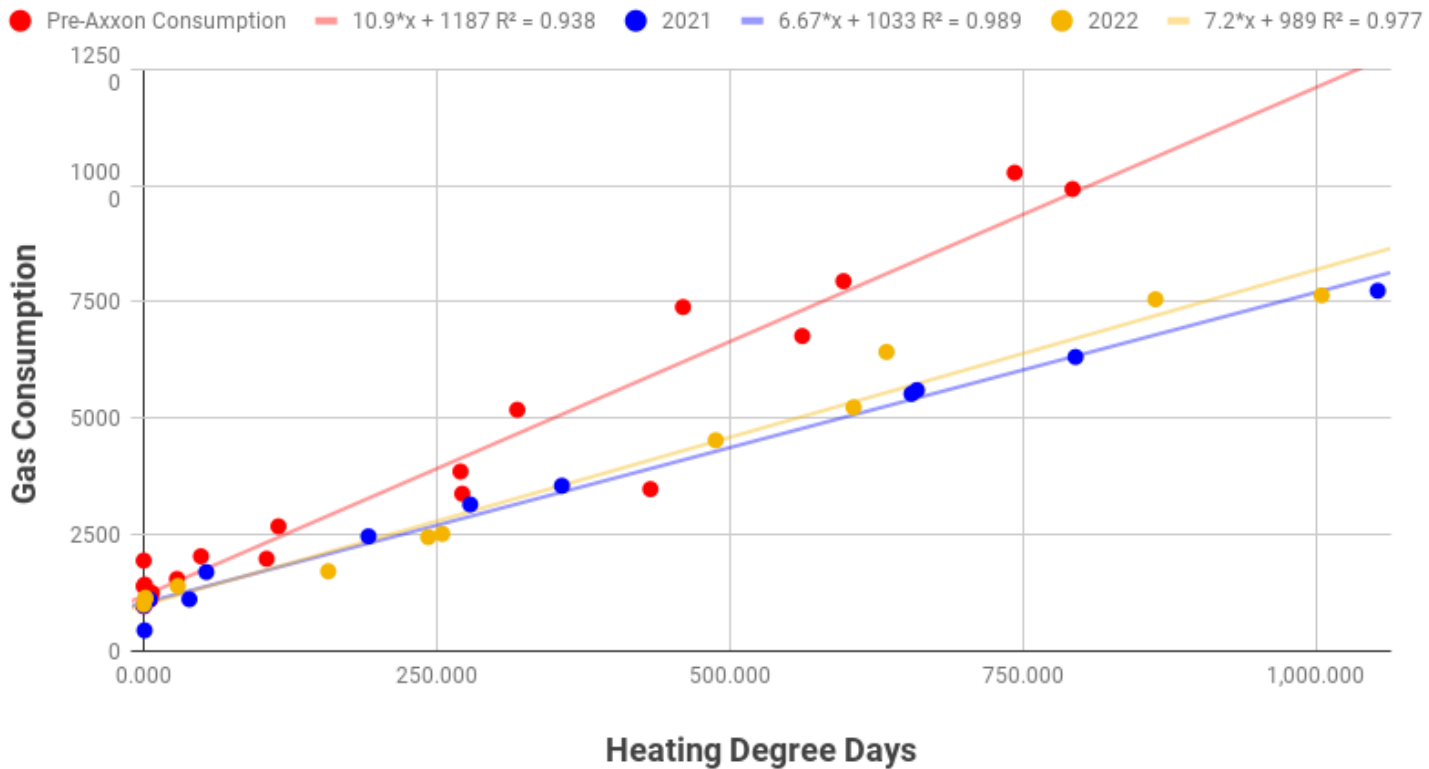
WALTON AVE, BRONX NY

- 65-unit Bronx multifamily
- 41% reduction gas spend
- Axxon installed December 2020
- Job cost: \$18,000
- Rebate: \$15,000
- Net price: \$3,000
- Cumulative savings: ~\$100,000



WALTON AVE, BRONX NY (CONT'D)

Gas Consumption/Heating Degree Day Analysis- [redacted] Avenue



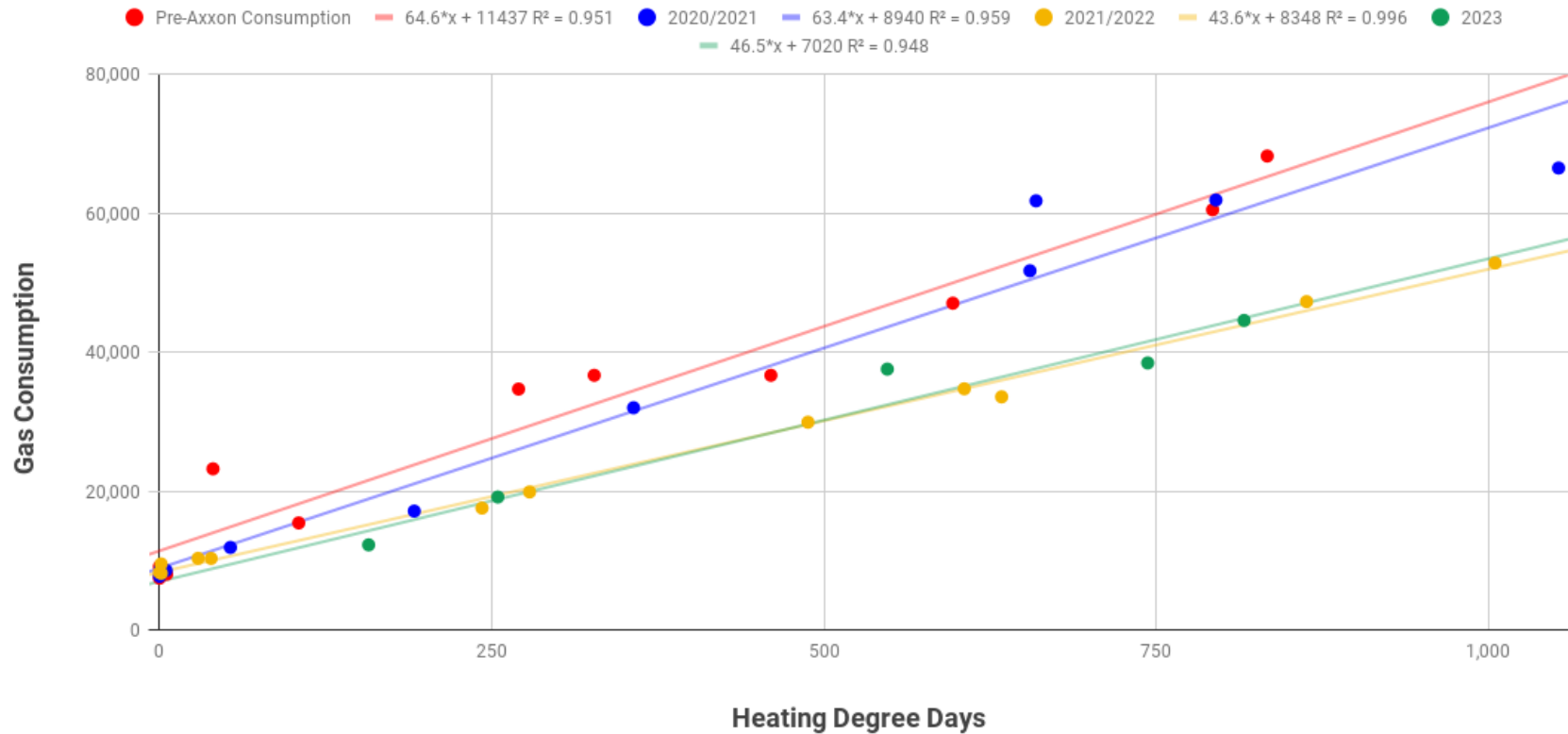
OGDEN AVE, BRONX NY

- 400+ unit Bronx multifamily
- 28% reduction gas spend
- Axxon installed October 2020
- 2020/2021 2% improvement
- 2021/2022 32% improvement
- 2022/2023 28% improvement
- Job cost: \$250,000
- Rebate: \$235,000
- Net price: \$15,000
- Cumulative savings: ~\$565,000



OGDEN AVE, BRONX NY (CONT'D)

Gas Consumption/Heating Degree Day Regression Analysis

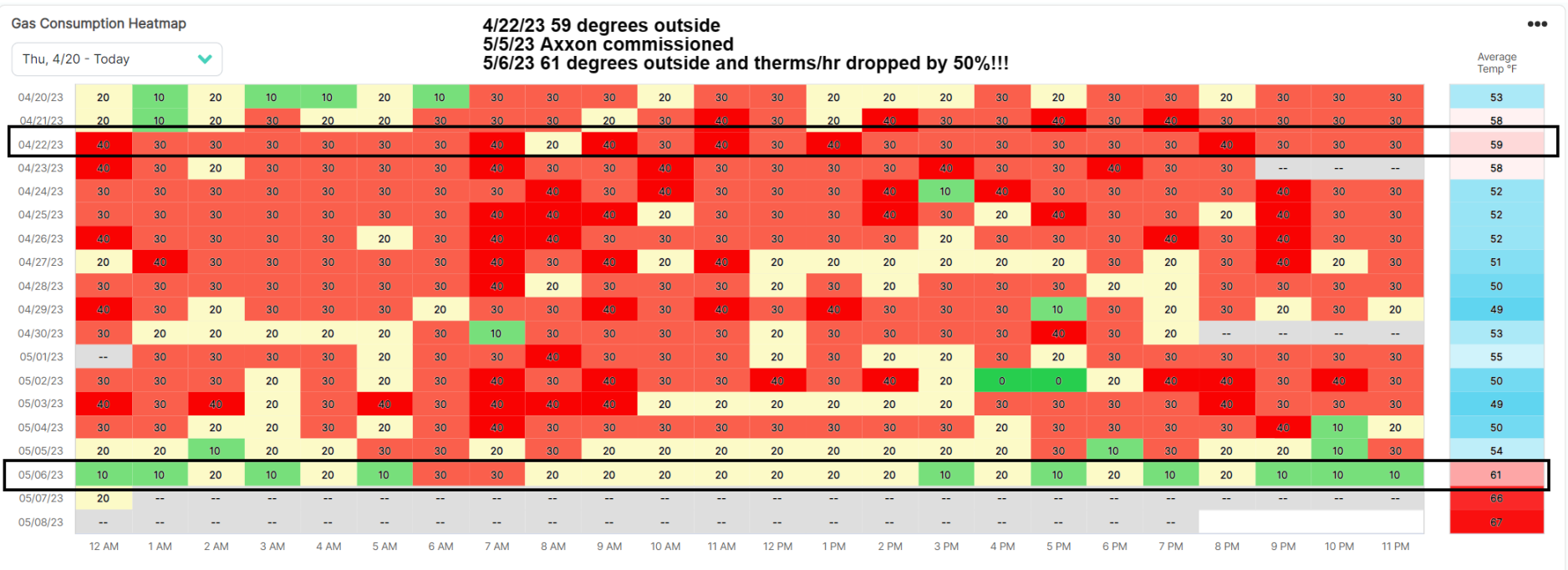


WEST 43RD STREET, MANHATTAN

- 350 unit Manhattan multifamily
- 20% reduction gas spend
- Axxon installed May 2023
- Job cost: \$49,500
- Rebate: \$24,700
- Net price: \$24,800
- Project annual savings: ~\$250,000



WEST 43RD STREET, BRONX NY (CONT'D)

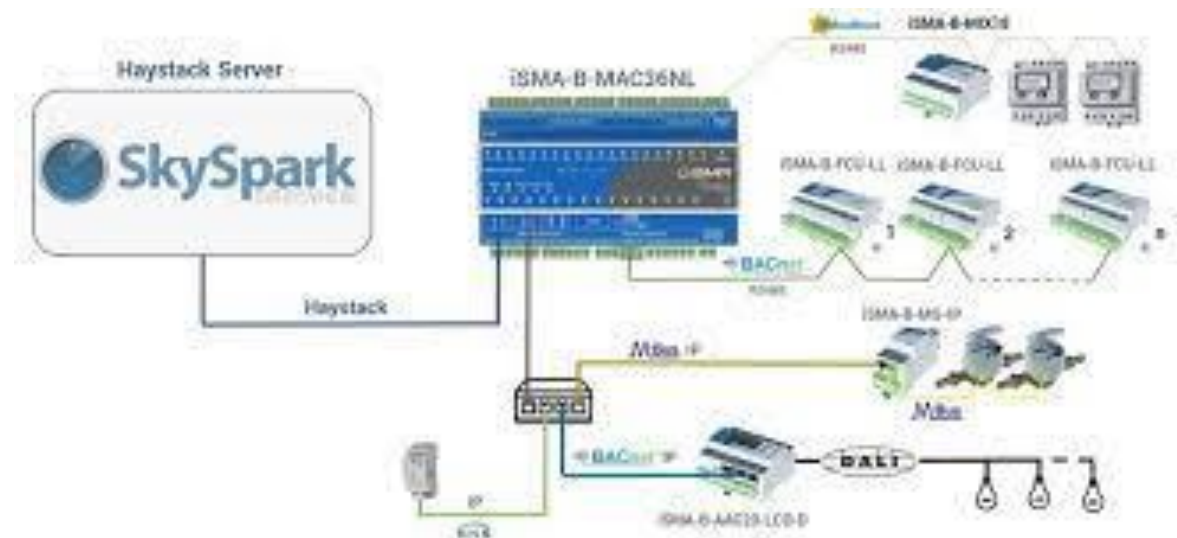




HAYSTACK IN OUR ROADMAP

HAYSTACK BASED CONTROLLERS

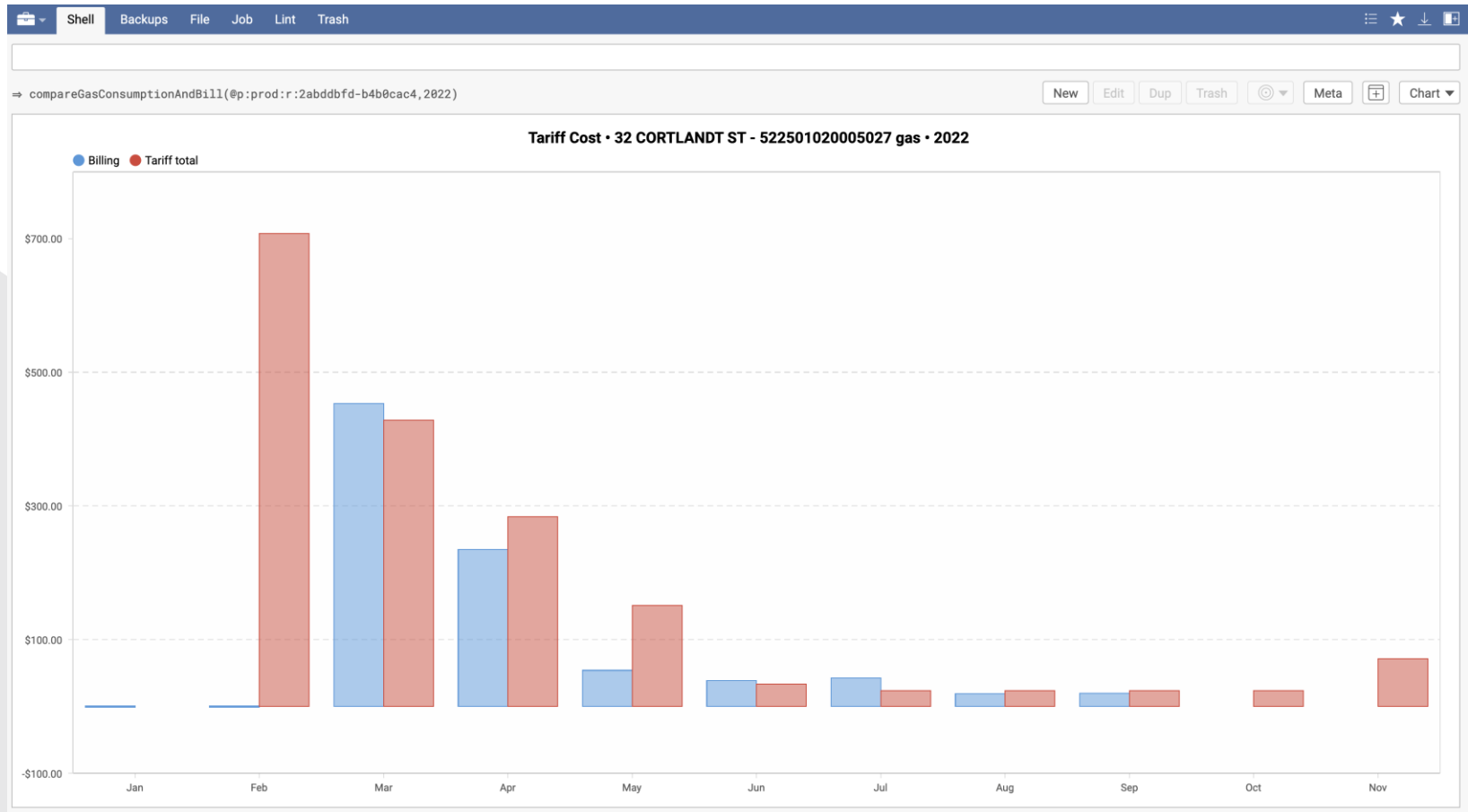
- Metalogic extraction
- Less man hours to deploy control logic updates
- Less man hours to initialize sites
- Greater quality control tagging with Haystack at the controller level



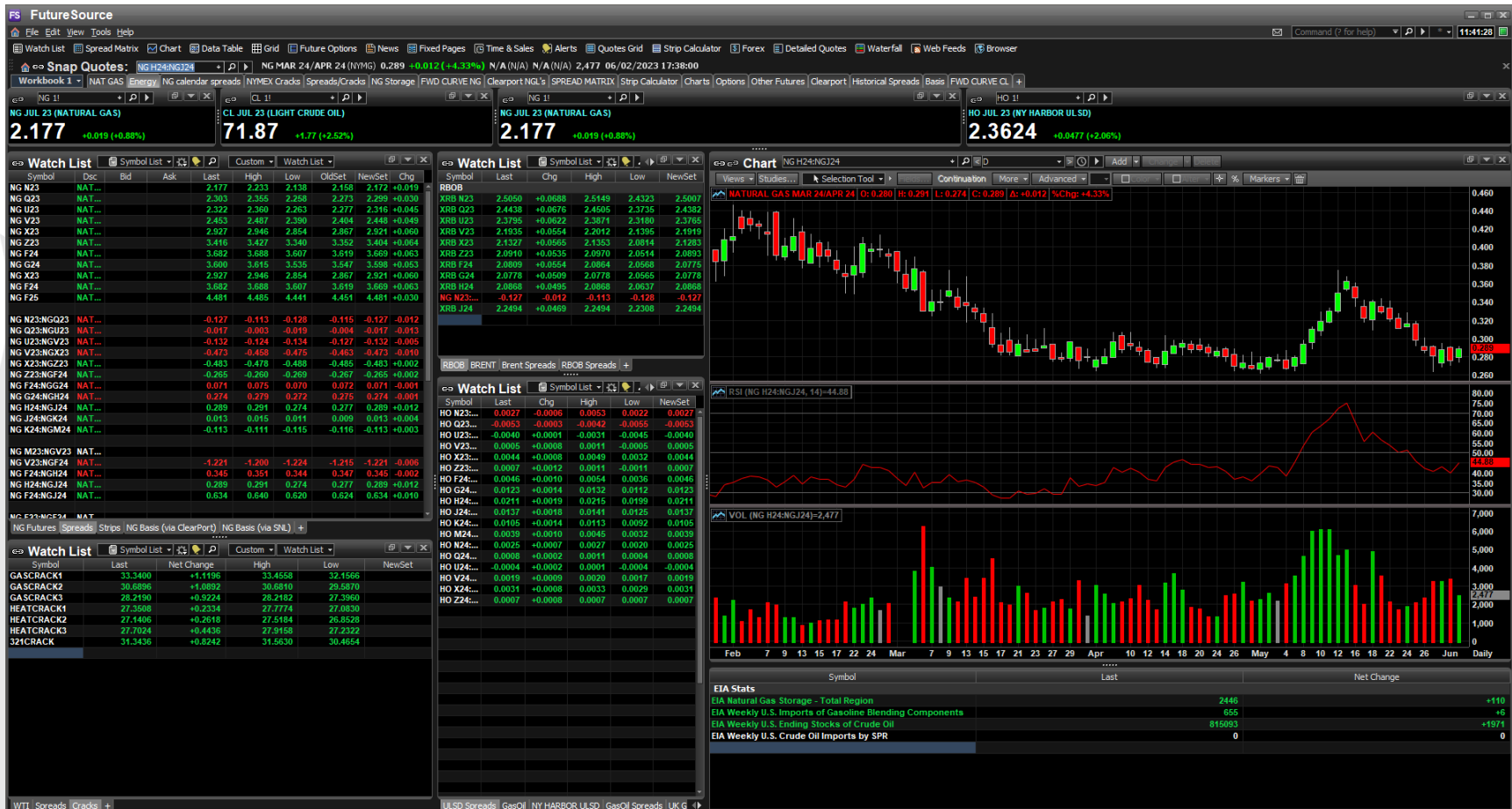
HVAC SERVICE



GREEN BUTTON CONNECT



THOUSANDS OF C&I EQUIPMENT CONNECTED TO MARKETS



SUMMARY

- Data is worthless if not acted upon
- Real estate owners are busy running their business and prefer turnkey solution providers
- Data creates a culture of scientific and intellectual integrity within your team (can't bullshit the data)
- When multiple contractors are in the mechanical room, data = less finger pointing
- Data allows contractors to be more efficient with their labor
- Data is a valuable lead generation tool (especially in "off season")
- Comfort related repairs have greater profit margin vs. tuning/optimization
- Merging mechanical and controls into one customer experience creates a deeper moat around your customer
- Total cost of ownership = maintenance + repairs + energy spend + management's time



INTEGRATED ENERGY SERVICES



Installation
& Service



Monitoring
& Controls



Energy
Supply

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Mount Vernon, NY 10550
347-669-2427

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