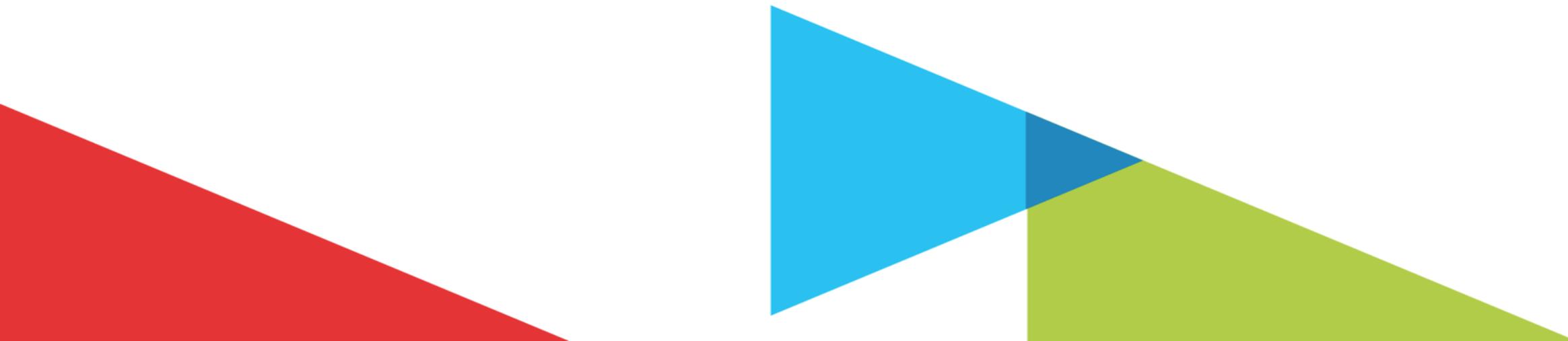


Emerging Technology Update

Presented by Randy Opdyke

September 17, 2019





Idea Generation & Application Process

- Web Based Submission Form
 - Go to: **www.NicorGasRebates.com**
 - Resources > Emerging Technology
 - General Questionnaire
 - Product Specific Questionnaire
- Stage Gate Process
 - Product is Scored
 - Evaluated
- Weighted Scale & Scoring
 - Score of 60+
 - Action Plan to Pilot

4S- A Ready, Set, Go Stage and Gate Process

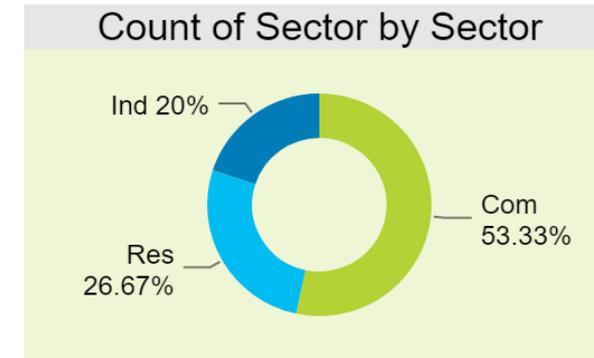
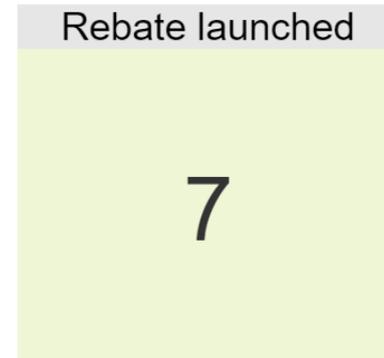
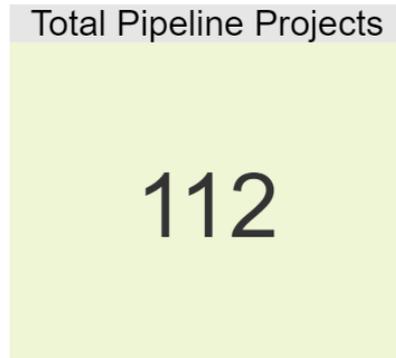


Criteria	Score	Weighting	Final Score
Cost-Effectiveness	0 to 5	5	0 to 25
Gas Savings Potential (Net Energy Savings)	0 to 5	4	0 to 20
Value to EEP Portfolio	0 to 5	3	0 to 15
Non-Energy Benefits	0 to 5	2	0 to 10
Regional Support and Distribution	0 to 5	2	0 to 10
Technological Maturity	0 to 5	2	0 to 10
Ease of Implementation/Market Adoption	0 to 5	2	0 to 10
TOTAL	-	-	0 to 100





Emerging Technologies Program



Pilot Name	Pilot Task Name	Finish	% Complete
Hydronic Heating Plumbing System Flushing	Descaling Radiators	10/11/19	5%
Venturi Steam Traps Phase 2 (Field Test)	Identify Field Test Site	10/25/19	20%
Pipe Insulation	CleaResult & Nicor Gas PM to review Excel File	11/01/19	15%
Low-E Interior Storm Windows	Install Low-E Windows	11/15/19	10%
Smart Radiator Valves	Install New Radiator Valves	11/15/19	10%
mCHP	Develop draft scope of work	11/22/19	5%
Air Deflector for Unit Ventilator (ADUV)	Air Diffuser Vendor Acquisition	11/26/19	75%
Gas Absorption Heat Pump Combi (GAHP)	Develop draft collaborative pilot action plan	12/05/19	40%
Gas Heat Pump Water Heater (GHPWH)	Develop draft collaborative pilot action plan	12/05/19	40%
Hydronic Heating Plumbing System Flushing TRM 2020	Early Discussion on the measure with Navigant	01/24/20	5%
Pipe Insulation TRM 2020	Early Discussion on the measure with Navigant	01/24/20	5%
Commercial Tankless Domestic Hot Water Array	Field Service Agreement	02/07/20	5%
Steam Boiler Array	Field Service Agreement	02/07/20	5%
Boiler Chemical Descaling	Site # 2 Post Descaling Data	02/14/20	20%



Active Pilot: Commercial Boiler Descaling

Dissolves water scale, lime, mud and rust deposits into solution.

Benefits:

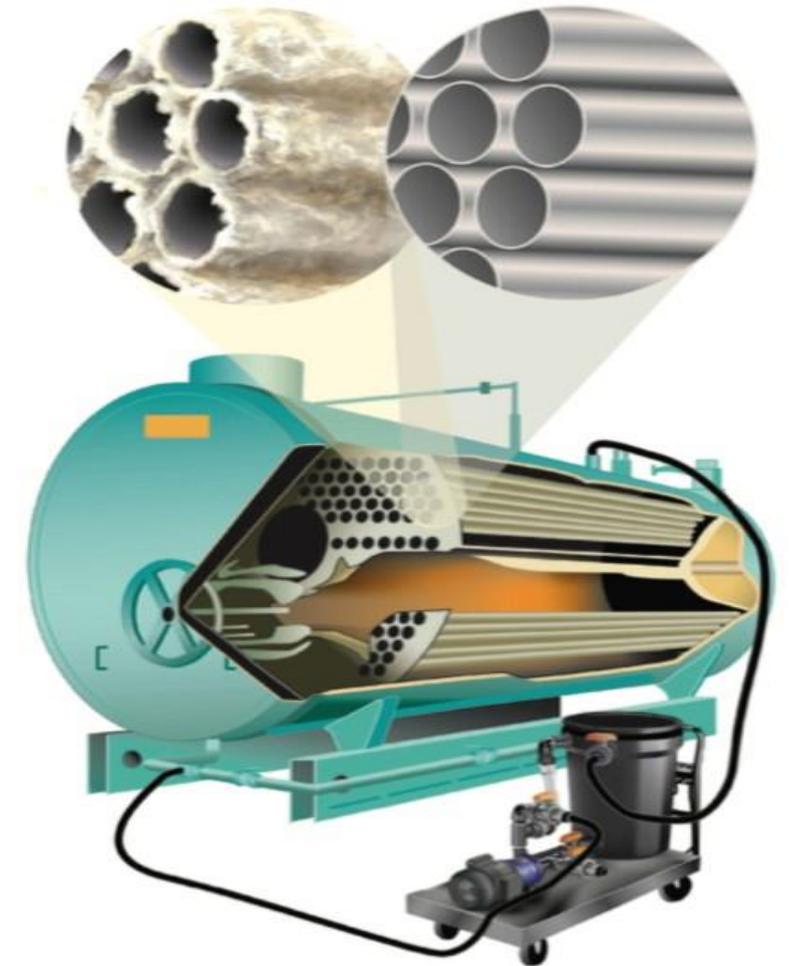
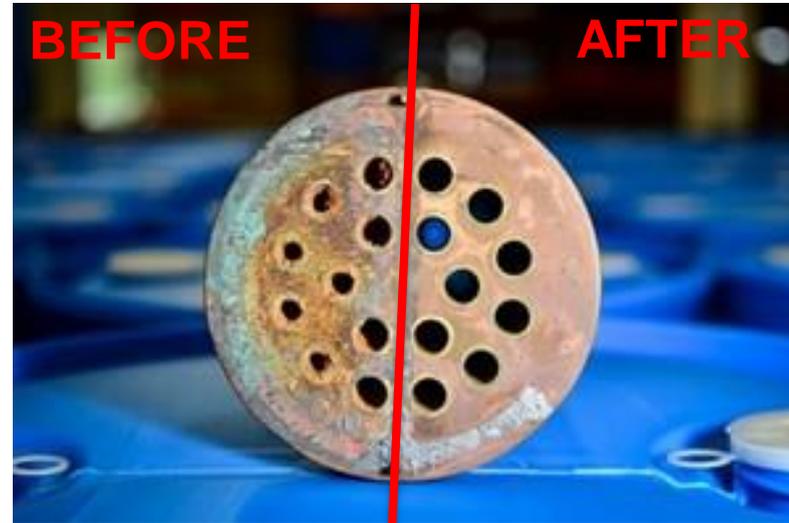
- Increases efficiency
- Reduces energy costs
- Increases useful life
- Non-toxic, Non-injurious, Non-flammable, Non-corrosive
- Non-hazardous
- Biodegradable

Market: all water based boilers

Fuel Cost Increase

1/16 inch buildup = 11% increase

1/2 inch buildup = 60% increase





Understanding the ETP Process Timeline

Boiler Descaling Technology

- 6/2014 - Technology Identified
- 11/2014 - Due diligence & research completed
- 4/2015 - Action plan completed
- 2015 to 2016 - Pilot acquisition search
- 10/2017 - Two pilot sites identified
 - Mooseheart
 - Commercial laundry

The Unexpected Happens



Boiler Descaling: Summer 2018 Pilot planned

- After boiler shutdowns
 - Mooseheart backs out of pilot
 - Decentralizing boiler plant
 - Commercial laundry has new owners
 - Decides to back out of pilot

Boiler Descaling: Summer of 2018 Pilot acquisition resumes again

- Identify Downers Grove School District for pilot
- Schedule summer of 2019 pilot
- Must wait for school to close and boilers to shutdown

Commercial Boiler Descaling Pilot Update



Host sites are two middle schools in

1. O'Neill Middle School
 2. Herrick Middle School
- Each middle school has (2) firetube steam boilers from the 1930s
 - Preventive maintenance - manual descaling annually – high water quality
 - Jan 2019 Combustion efficiencies measured to establish the baseline
 - (4) Boiler Descaled in August 2019



Commercial Boiler Descaling Pilot Update



Boilers exhibited promising visual results
Dissolves water scale, lime, mud and rust deposits into solution.

BEFORE

AFTER



One Year Buildup

Commercial Boiler Descaling Pilot Update



Next Steps

- Determine preliminary savings using an analytical approach based on the baseline and the scaling-descaling seen at the site.
- Determine combustion efficiencies (boiler running at full capacity) and the savings calculation from these numbers will be compared to the analytical savings.
- The final report is scheduled to be finished following the above in Q1 2020.
- Conservative case for savings based on preventive maintenance scheduled and hard water quality.



Upcoming Interesting Pilots



Hydronic Heating Plumbing System Flushing

- Sparked from Boiler Descaling Pilot
- Rockford park district



Gas Heat Pump Water Heater & Combi

- AFUE efficiencies above 100%
- Leveraging with other utilities

Commercial Tankless Hot Water Array

- Instantaneous water heat without using storage tanks
- Hot water demand response





Energy
Efficiency
Program

Questions?

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