



CHEM | E SHOW | 23



november 28-30, 2023 | moody gardens, galveston, tx

Gulf Energy[®]



Enterprise-wide Energy Efficiency Fleet Monitoring Tool

Energy lives here™

Presented: 2023 ChemE Show
Energy Efficiency & Decarbonization – Projects & Programs
Date: November 28-30, 2023

Bill Hicks (EMTEC)

Contents of this presentation is based on "Enterprise-wide Energy efficiency fleet monitoring tool", Hydrocarbon Processing, Sept. 2021; [Enterprise-wide energy efficiency fleet monitoring tool \(hydrocarbonprocessing.com\)](https://www.hydrocarbonprocessing.com)

Acknowledgements

Kirtan Trivedi (EMGP)

Andy Hoyle (EMTEC)

Nick Smith (LCS)

Sandeep Sen Gupta (EMTEC)

Phoebe Belser (EMPS)

Kris Chunangad (EMTEC)

Keen Seng Cheah (EMTEC)

Marcus Poon (EMTEC)

Suhas Nehete/Hidayah Nasir

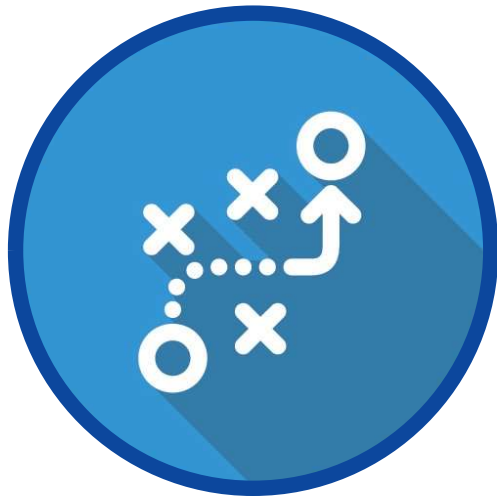


Disclaimer

©2019 ExxonMobil. All rights reserved. ExxonMobil, the ExxonMobil logo, the interlocking “X” device and other product or service names used herein are trademarks of ExxonMobil, unless indicated otherwise. This document may not be distributed, displayed, copied or altered without ExxonMobil's prior written authorization. This presentation is for discussion purposes only, and includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1A of ExxonMobil’s latest report on Form 10-K or information set forth under “factors affecting future results” on the “investors” page of our website at www.exxonmobil.com). You may not copy this document to or reproduce it in whole or in part on a website. ExxonMobil does not guarantee the typical (or other) values. Any data included herein is based upon analysis of representative samples. ExxonMobil does not represent, warrant, or otherwise guarantee, expressly or impliedly, the merchantability, fitness for a particular purpose, freedom from patent infringement, suitability, accuracy, reliability, or completeness of this information or the products, materials or processes described. The user is solely responsible for all determinations regarding any use of material or product and any process in its territories of interest. We expressly disclaim liability for any loss, damage or injury directly or indirectly suffered or incurred as a result of or related to anyone using or relying on any of the information in this document. This document is not an endorsement of any non-ExxonMobil product or process, and we expressly disclaim any contrary implication. The terms “we,” “our,” and “ExxonMobil” are each used for convenience, and may include any one or more of ExxonMobil Chemical Company, ExxonMobil Research and Engineering Company, Exxon Mobil Corporation, or any affiliate either directly or indirectly stewarded.

ExxonMobil Fleet Management





 Reduce CO₂ Emissions

 Optimize Energy

 Minimize Inefficiency

Fleet Management | Key to Efficiency Improvement

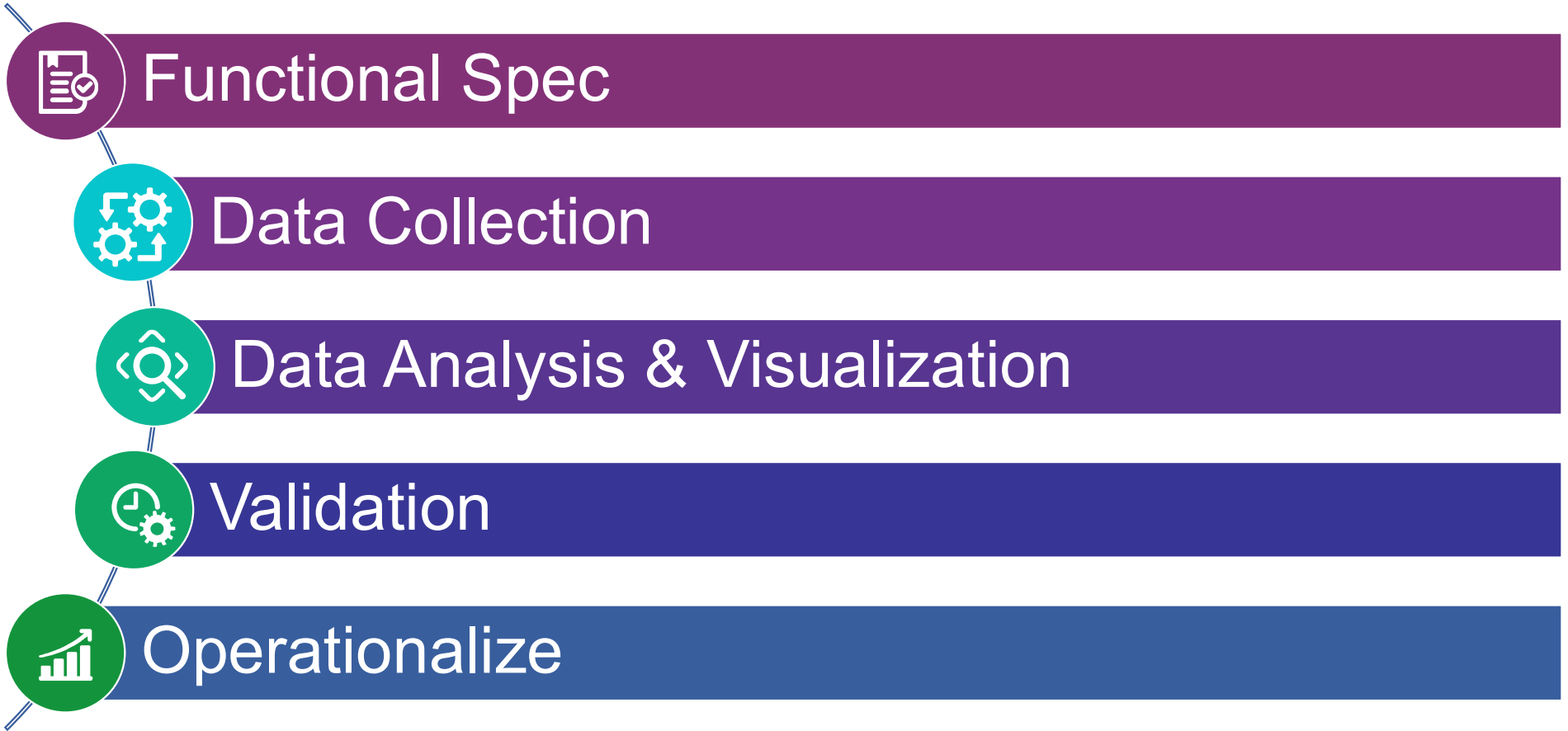
Case for Action

- Energy Efficiency
- Sustainability
- Green House Gas Emissions

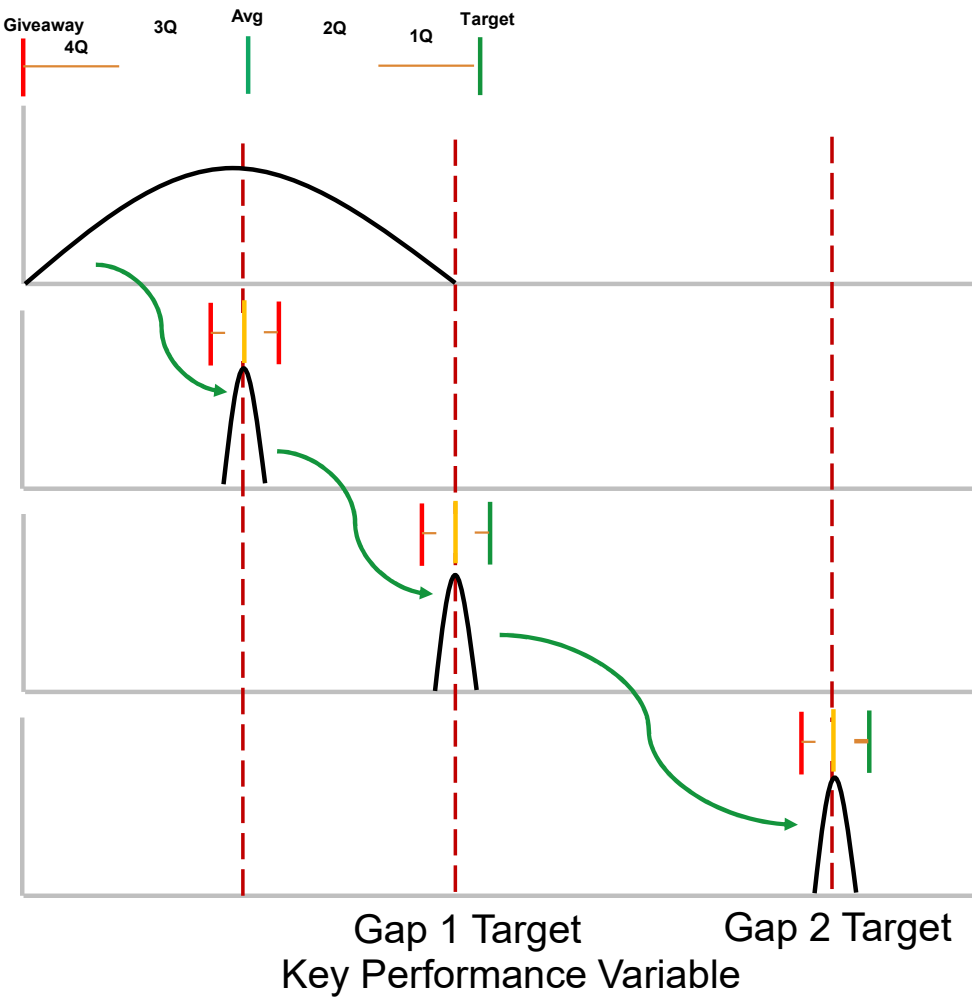
Objectives

- Identify/prioritize potential opportunities
- Gap estimate based on historical data and engineering benchmarks
- Identify long term trends
- Enterprise wide team for development and deployment

Development | Work Process



Journey To Performance Excellence



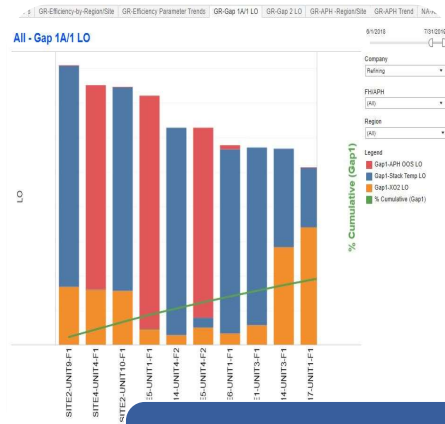
- Current**
 - High Variability
- Gap1A**
 - Reduce Variability
 - Move towards G1 target
- Gap 1**
 - Best Demonstrated
- Gap 2**
 - Best Achievable
 - Facility Changes

Fleet Operationalize

All - Top 10 Gap 1A/1 LO (Past 12 months)

EMEAP	SITE17-UNIT5-F1	Relative Ranking ↓
	SITE8-UNIT10-F1	
	SITE2-UNIT9-F1	
	SITE2-UNIT10-F1	
	SITE14-UNIT4-F2	
	SITE1-UNIT3-F1	
	SITE14-UNIT3-F1	
	SITE17-UNIT1-F1	
	SITE17-UNIT6-F1	
	SITE2-UNIT11-F1	
NA	SITE4-UNIT4-F1	Relative Ranking ↓
	SITE5-UNIT1-F1	
	SITE5-UNIT4-F2	
	SITE6-UNIT1-F1	
	SITE7-UNIT1-F1	
	SITE7-UNIT2-F2	
	SITE6-UNIT1-F2	

Equipment Opportunities



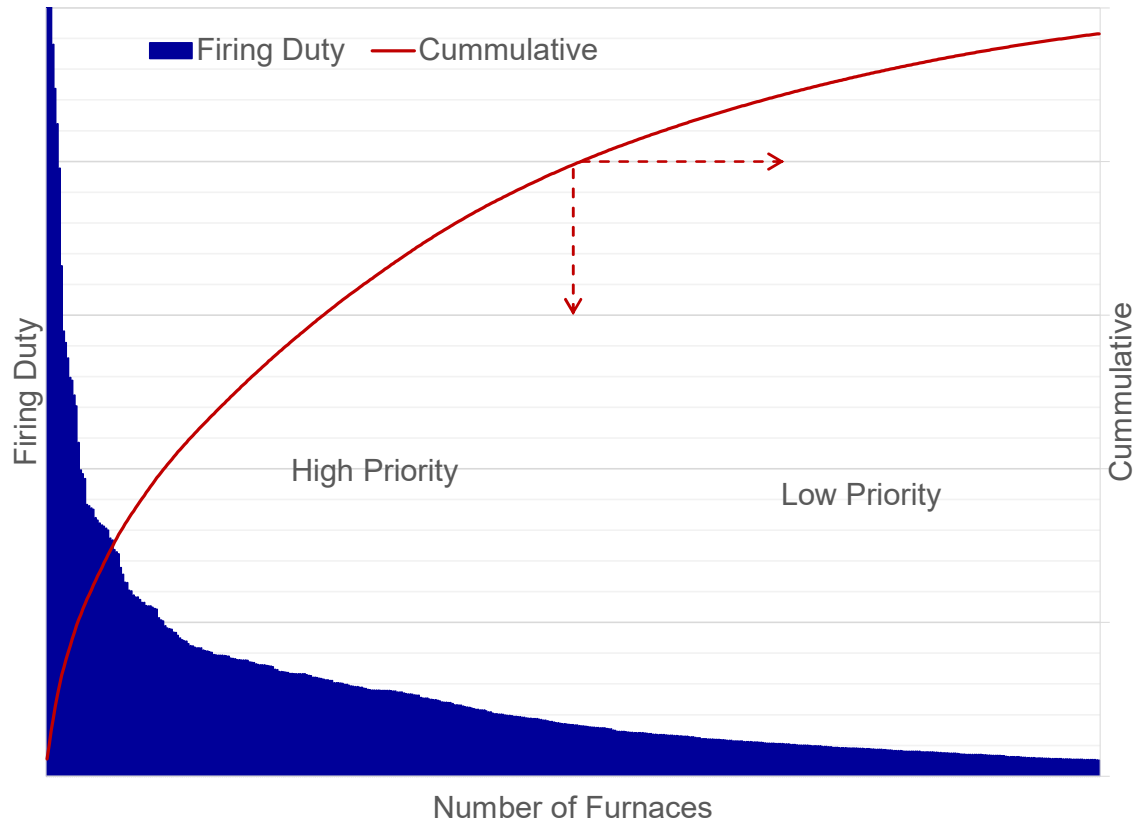
Dominant Cause



Gap Closure

- Site, Subject Matter Experts, Business Team

Fleet Population & Development Scope

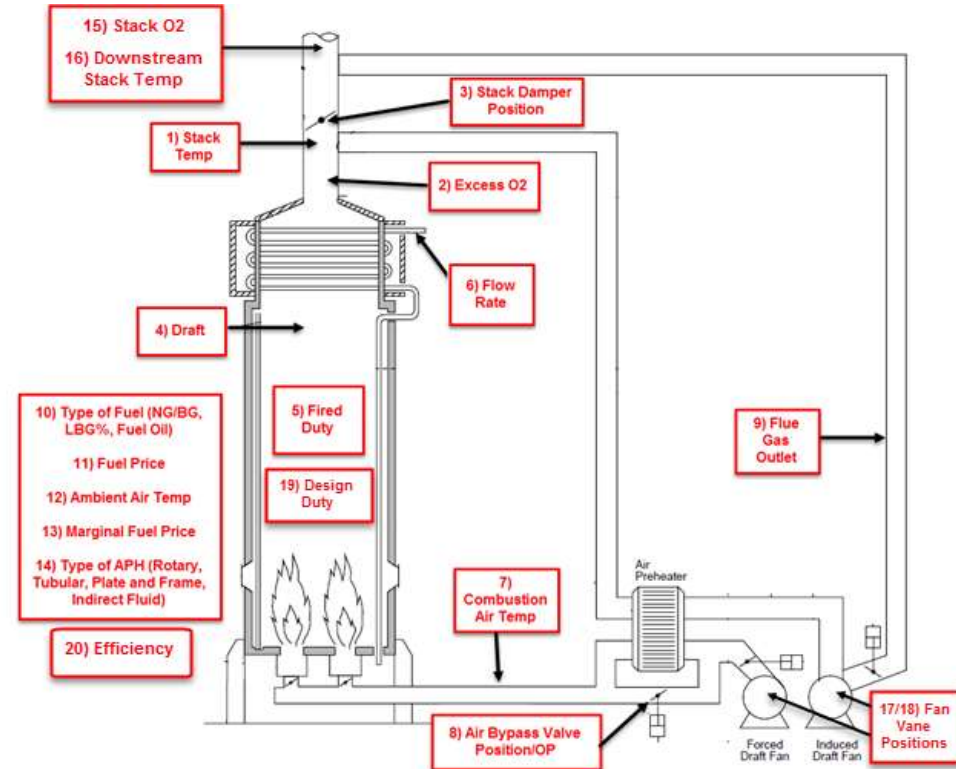


Source: Getty Images

- Fleet population is prioritized based on firing duty
- All types of FH and all FH having APH

Requirements | Process Data

- Equipment Information / tag collection
- Historical process information through data historian system
- Complete dataset uploaded into Tableau
- Validation exercise with sites and subject matter experts



Benchmarks | Target Definition



Gap 1

- Historical Performance
- 10 or 90 percentile of daily data

Gap 2

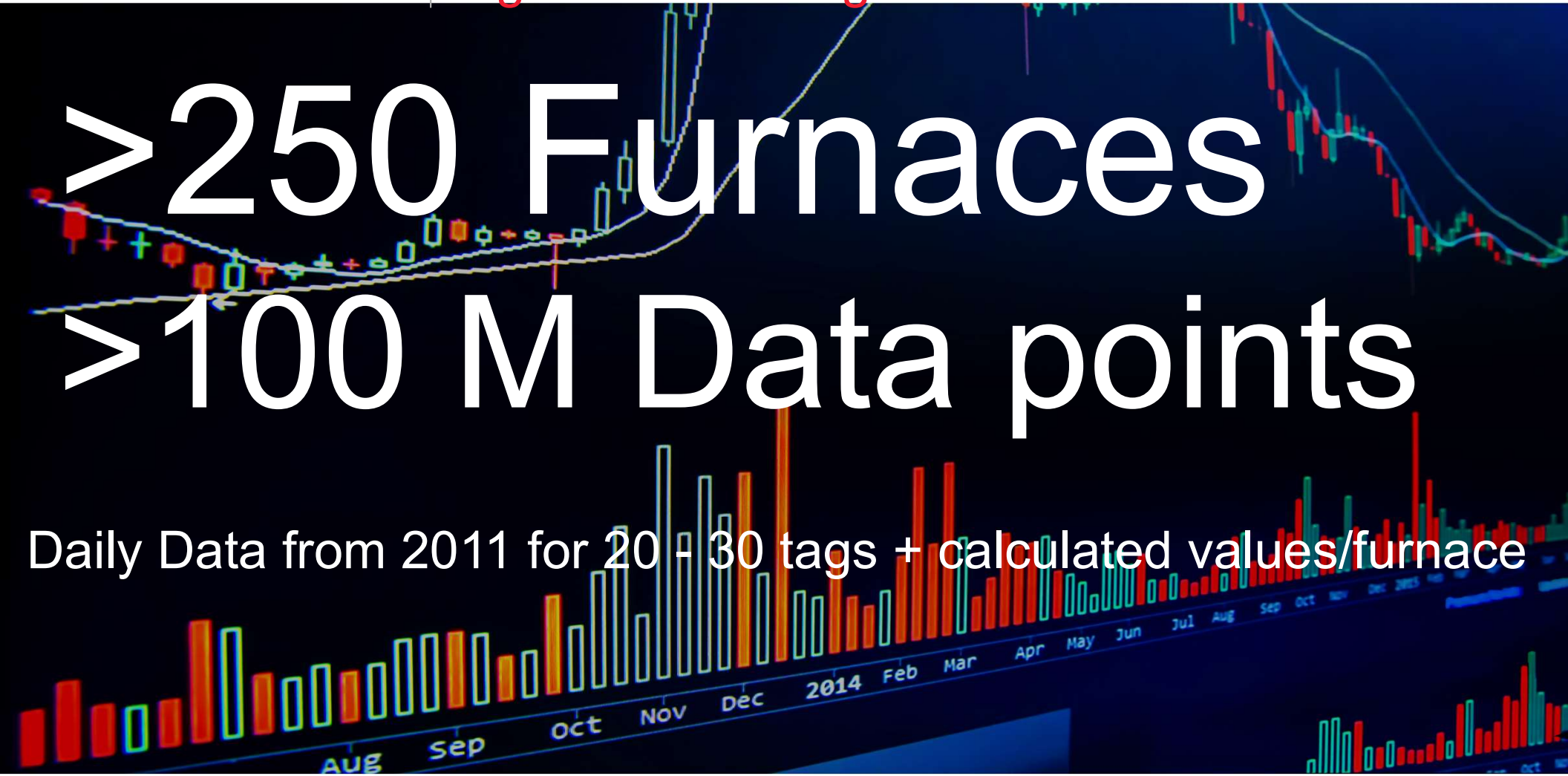
- Engineering benchmarks
- 300 - 350°F for stack temperature
- 1.5 - 2 % excess O₂

Tool Features | Big Data Handling

> 250 Furnaces

> 100 M Data points

Daily Data from 2011 for 20 - 30 tags + calculated values/furnace



Dashboards

Fired Heater



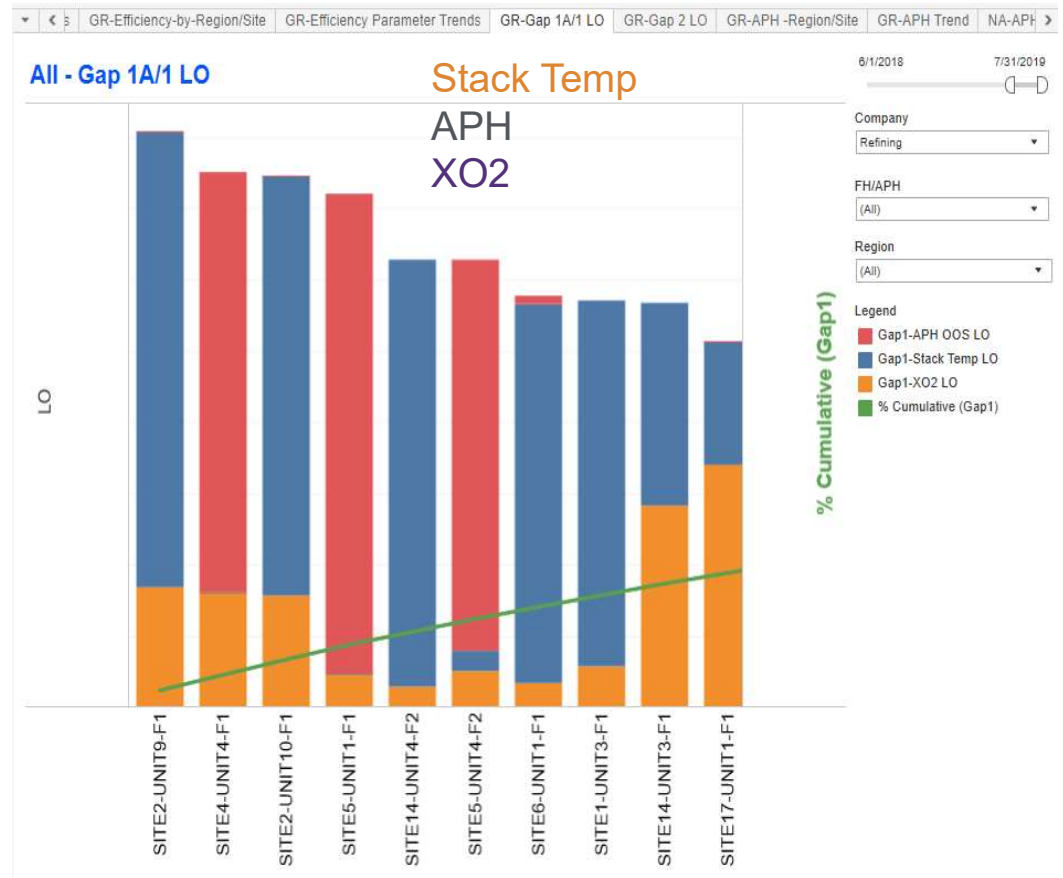
Fleet Population

Global / Regional

Site

Equipment

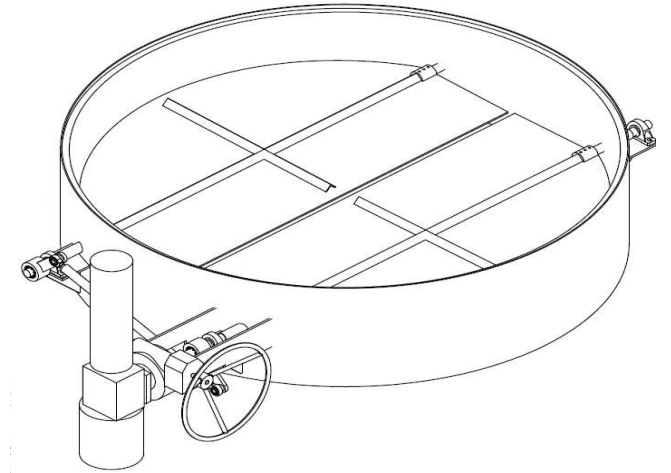
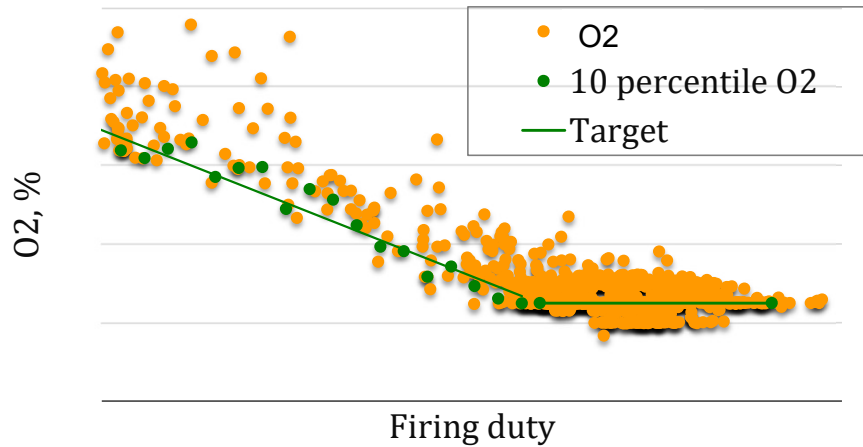
Opportunities | Areas for Improvement



Improve Time For Action



Excess Air | Offer Technical solution for Gap Closure



Source: Getty Images

Establish best demonstrated performance under turndown conditions

Triggers root cause investigation to minimize gap

- Damper repairs
- Seal – Leaking furnaces
- CO breakthrough testing – for turndown operations



Source: Getty Images

Stack Temperature

Offer Technical solution for Gap Closure



Gap Closure Solutions

- Convection/Radiant section fouling
 - Online cleaning – Chemical clean
 - Offline cleaning – Sand blast, hydroblast etc



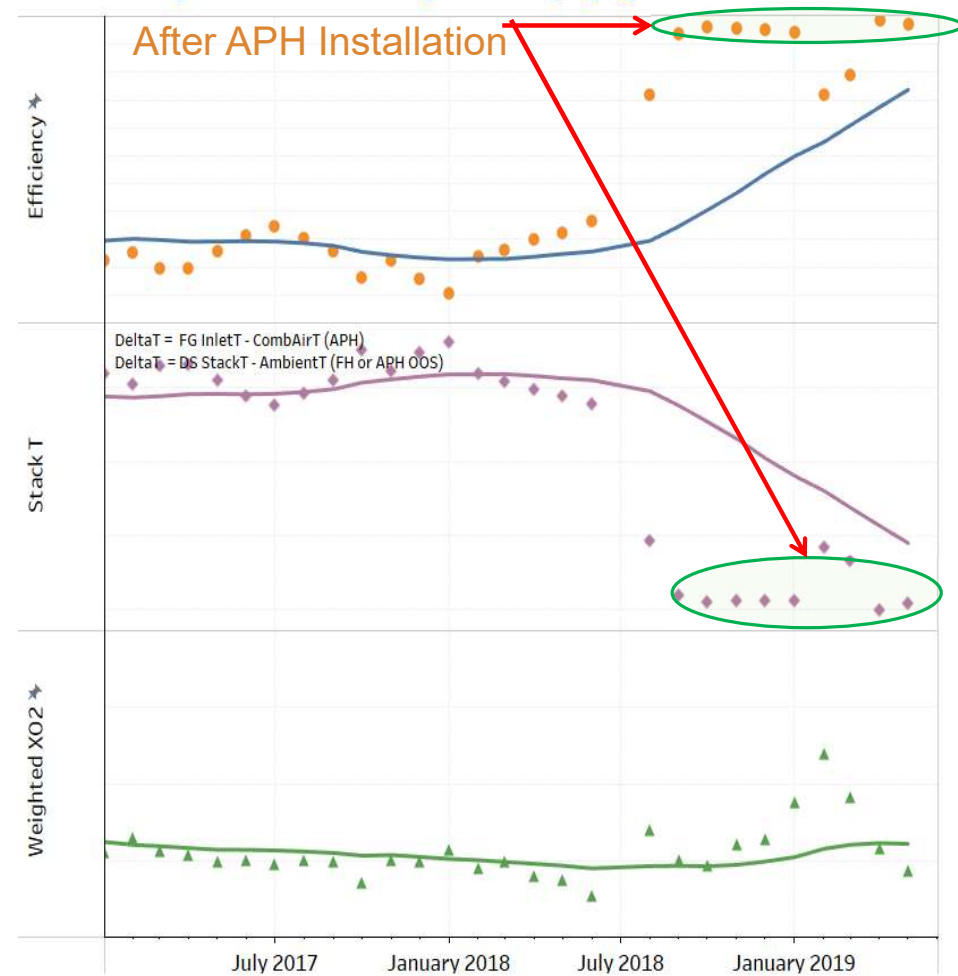
Source: Getty Images

Structural Improvements

Project justification

- Provides justification for potential structural improvements
 - APH reliability improvements
 - Revamp for improved metallurgy/technology
 - Preventive regular maintenance
- APH Installation
- Tool helps to convey actual monetary loss incurred vs typical project justification
- 10-15% improvement identified at few sites and included in site execution plans

All - Efficiency Parameter Trends [DeltaT in (degF)]



Site Empowerment | Drives Energy Excellence



