

# *SmartBurn*<sup>®</sup>

Knowledge Makes Power.



[www.smartburn.com](http://www.smartburn.com)



*Our experience and expertise allows us to develop and implement a combustion improvement project from start to finish.*

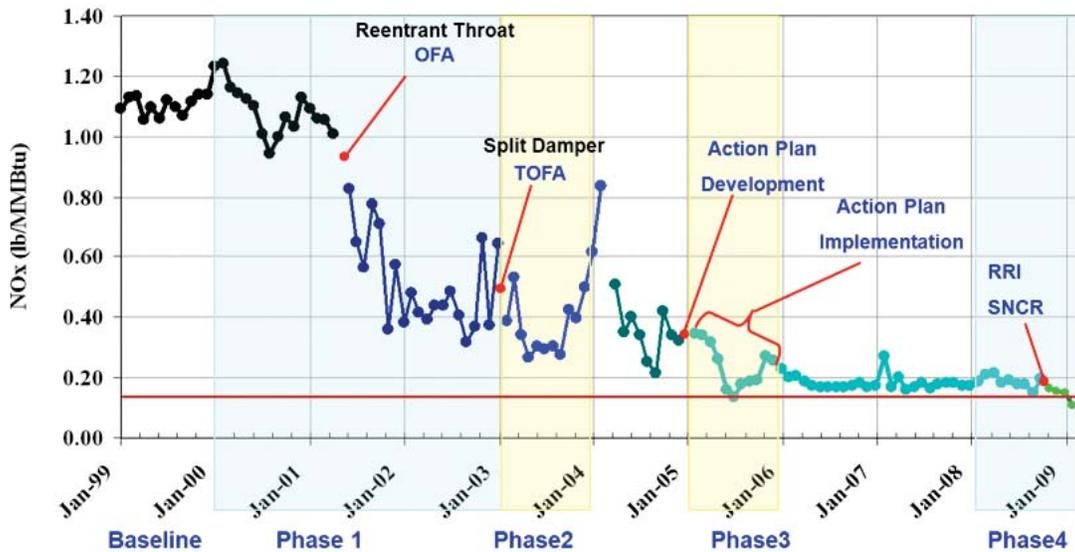
## Discovering the untapped potential ...

Improving efficiency, reducing emissions, mitigating slagging and fouling, switching fuel, and implementing capital projects are significant challenges for owners and operators of coal-fired boilers. Increasing environmental regulations and economic pressures also add to the complexity of operating in this market. To thrive in this competitive and quickly changing business, power producers must:

- Maximize profit from the sale of power and services to their markets
- Maintain current generation output and minimize increases in auxiliary power demand
- Reduce forced outage rates
- Increase unit efficiency, reliability, availability, and capacity
- Improve operation flexibility
- Achieve compliance with changing standards and requirements

SmartBurn® can help your business meet these goals by improving your combustion process. We have the ability to re-engineer your existing boiler, regardless of its age, by integrating scientific, theoretical, and technological advances. Our goal is to help you maximize business value and minimize your environmental impact while meeting stakeholder expectations.

**Edgewater Unit 4, WI  
Monthly NOx Emission Rate (1999-2009)**



## Delivering Business Value ...

At SmartBurn, we assess the entire combustion process—from intake of fuel to the backend products of combustion—along with your business needs to uncover new potential for improved performance.

### Consulting

We understand our clients' regulatory, business and operational challenges. Our Applied Computational Modeling (ACM) capabilities along with our extensive boiler experience and knowledge of fleet strategy and plant operations allow us to accurately conduct technical assessments on your fuel, equipment, and operations and maintenance strategies. We analyze the interaction of a multitude of variables in your combustion process to understand your boilers' operational capabilities and uncover solutions that enhance your fleet's performance and your bottom line.

### Plant/Fleet Optimization

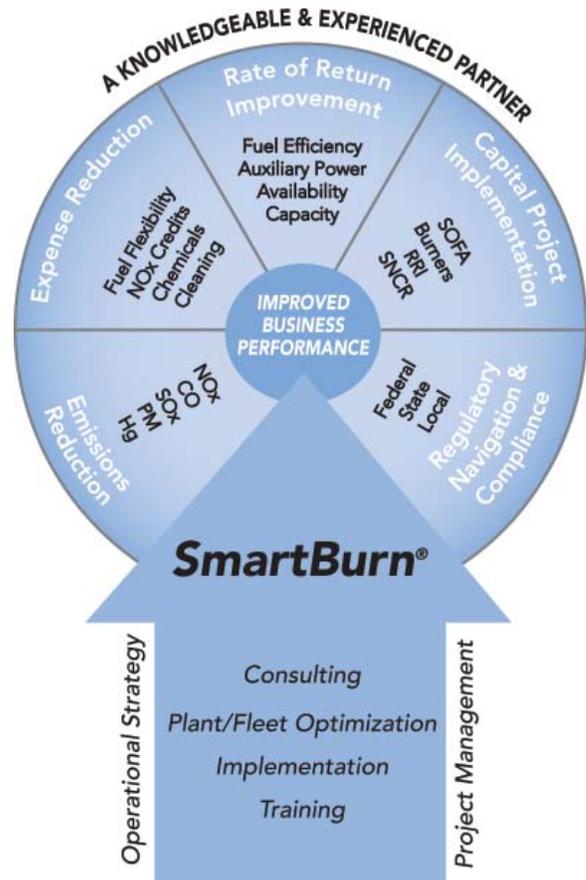
Not only do we test, tune and troubleshoot all performance aspects of your boilers, we also design and commission new controls and components to make sure your boilers yield optimal results.

### Implementation

SmartBurn works with clients to take on custom and unique approaches to project management and equipment procurement that allow them to exercise a high level of equipment and services sourcing and cost control. We work with other vendors as needed to ensure that the project exceeds our clients' expectations.

### Training

We understand the importance of delivering long-term solutions. Our training and ongoing support ensure that improved operating protocols are sustainable.



*SmartBurn's analysis tools, knowledge of the combustion process, and practical business applications deliver solutions to optimize your business performance and sustain long-term results.*

### SmartBurn Proven Success

- Achieved best-in-class NOx emissions of 0.18 lb/MMBtu in a large, cyclone-fired boiler through combustion improvements
- Demonstrated 0.13 lb/MMBtu NOx emissions on a large, wall-fired unit with low NOx firing system
- Reduced NOx emissions on T-fired units to 0.11 lb/MMBtu with the potential for further reductions to below 0.08 lb/MMBtu through combustion improvements
- Realized up to 50 percent NOx emission reductions with Eastern bituminous coal by improving existing boiler combustion system

### Value You Can Count On

*With SmartBurn, you'll get a knowledgeable and experienced partner who will help you:*

- Identify and implement a customized strategy using proven techniques and advanced mathematical applications
- Re-configure aspects of your boilers utilizing science, operations, and engineering
- Ensure that your fleet's performance is sustainable over a long period of time

SmartBurn helps you optimally manage fleet operations and proactively control availability, reliability, efficiency, fuel flexibility, lifespan and capacity factors—resulting in positive impacts to your bottom line.

*By improving your combustion process, SmartBurn helps maximize business value and minimize environmental impact.*

## **Unparalleled Experience & Expertise ...**

SmartBurn has experience performing work on nearly 50 coal-fired units of varying coal types—often making significant combustion improvements. These projects include baseload, cycling and large industrial boilers with fuels ranging from Eastern and Midwestern bituminous coals, to Powder River Basin (PRB) coals, PRB/bituminous blends, PRB/petroleum coke blends, and PRB/biomass blends.

Our combustion science experts apply the fundamentals of combustion chemistry with tools like ACM, allowing SmartBurn to safely push the boundaries beyond those achieved by conventional methodologies. Our experience and expertise allows us to develop and implement a combustion improvement project from start to finish.

## **Custom Solutions ...**

Delivering solutions to meet our clients' environmental and energy objectives has been our fundamental business philosophy over the years. SmartBurn understands your industry, business operations, goals, and constraints. We develop custom solutions to complex environmental and energy issues that meet regulatory requirements. We focus on creating balanced solutions to support sustainable business practices.

## **Tools that Distinguish SmartBurn**

*Using our Applied Computational Modeling (ACM) expertise, we employ millions of partial differential equations to replicate and validate your boilers' unique combustion properties. ACM allows us to perform root-cause analysis and also provides predictive capability to understand how your boiler will perform under varying conditions, with alternate fuels or potential enhancement modifications.*

