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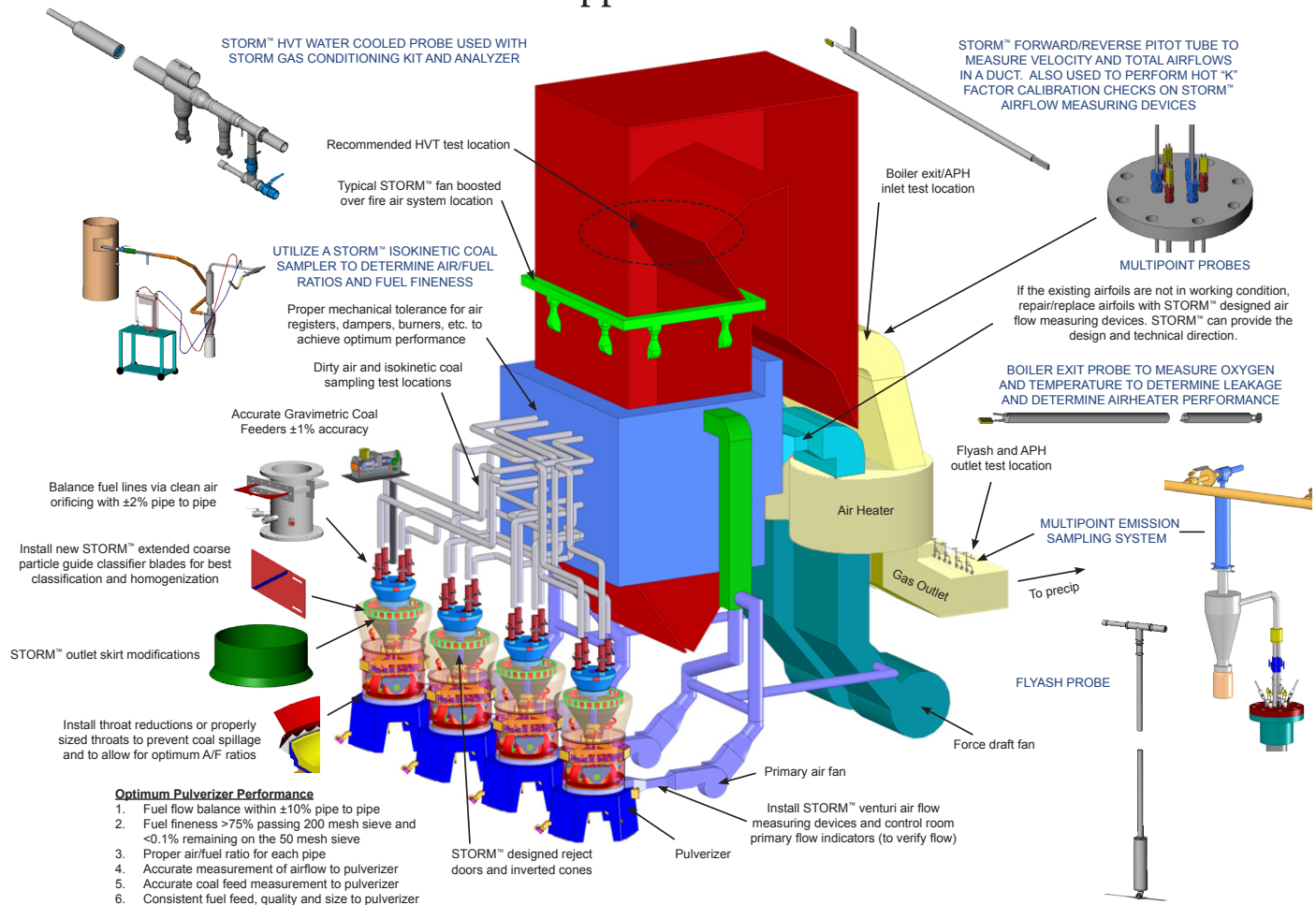
## Applying the Fundamentals for the Stretching of Available Maintenance Dollars

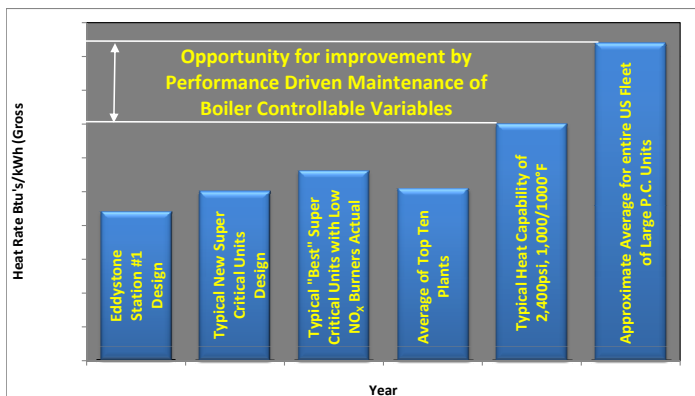
Performance driven maintenance has been a theme that has been promoted for decades. Now that slim budgets are even more slim, here are some reasons why and how testing and “connecting the dots” of the test data can result in the most cost effective use of limited maintenance funds. We have seen this work and work well.

**Step 1** – Perform a comprehensive diagnostic test on the boiler, pulverizers, air heaters and combustion air systems (see our enclosed flyer on test equipment).

**Step 2** – Summarize the data from the comprehensive diagnostic test and make a list of opportunities for the next outage. Use the highest priorities to apply the maintenance funds for the most benefit per dollar. Example: If pulverizer fuel fineness and distribution is terrible, apply it to the mill overhauls. Consider Storm performance improvements. See the March issue of POWER Magazine at [www.powermag.com](http://www.powermag.com) on Blueprinting Your Pulverizer. If air in-leakage and air heater leakage is excessive then make an action plan to correct these.

### STORM™ “Performance Driven Approach” is Condition Based Maintenance





**Table 1**

**Step 3** – Perform the corrections during the outage. Involve performance engineers with the maintenance work so that a team approach is applied.

**Step 4** – Perform mechanical tuning and calibrations at start-up and verify that the goals have been accomplished.

**Step 5** – Perform periodic equipment tests through the year and use the test data to plan maintenance and to make certain that minimum required standards of fuel and air measurements, distribution, fineness and leakages are monitored and corrective actions planned.

Controllable Variable Quantities		
Reduction of Air In-Leakage	Interrelated	240 Btu/kWh
Reduction of Dry Gas Loss		
Reduction of Coal "Pyrite" Rejects		40 Btu/kWh
Reduction of Air Heater Leakage		60 Btu/kWh
Reduced Carbon in Ash		100 Btu/kWh
Reduction of De-Superheating Spray Water Flows		60 Btu/kWh
Achieve by:		
- Primary Airflow Optimization		
- Pulverizer Optimization and Improved		
- Fuel Line Balance		
<b>Total</b>		<b>500 Btu/kWh</b>

**Table 2**

The savings available vary from plant to plant. However, Table 1 illustrates the heat rate improvements available in many plants, which can be identified through a comprehensive testing program. Testing will assist in identifying many opportunities, typical improvements which can be realized with Performance Driven Maintenance are shown in Table 2. From our experience typical units have around 500-600 Btu/kWh improvement opportunities and others much more. Many of the savings are related to reduction of air in-leakage on balanced draft boilers, airflow measurement and control, pulverizer optimization, and air heater performance improvements.

## Summary

Best performance for fuels flexibility, for lowest NO<sub>x</sub>, best reliability, maximum capacity and best heat rate depend on applying the fundamentals first. The thirteen essentials for pulverized coal fired boilers, applying those essentials that are applicable are necessary for all combustion systems. Including cyclones, CFBs and oil fired boilers. The fundamentals/essentials are always important, often overlooked. Please visit our website at [www.stormeng.com](http://www.stormeng.com). There you will find numerous technical papers and magazine articles that our team has authored to show how Results can be achieved for the best use of your resources, including available maintenance funds.

Sincerely,

Richard F. Storm  
Senior Consultant/CEO

**2 Day Short Courses**  
**Large Electric Utility**  
**Boiler Combustion and**  
**Performance Optimization**

**2 Locations:**

**Fundamentals Course:**

June 10-11th, 2009

Location: To be determined  
Las Vegas, NV

**Advanced Course:**

July 15-16th, 2009

Charlotte Marriott SouthPark  
Charlotte, NC

For more details call: (704) 983-2040