

A photograph of a boiler room featuring several large, light blue Cleaver-Brooks industrial boilers. The room is filled with complex piping, valves, and electrical control panels. The Cleaver-Brooks logo is visible on the top of the main boiler in the foreground. The background shows another similar boiler and various industrial components.

Cleaver-Brooks

BOILER ROOMS

Savings in the SYSTEM

The Existing Boiler System

- Incremental efficiency increases.
 - Repairing and Making New
 - Better Controls; Better use of Fuel
 - Electrical Savings; VSD's on pumps and fans
- Bigger Investments
 - Extensive Cleaning
 - New Burners
 - New Boilers

Repairing and Making New

- Replacing burner Components to maximize the Burner Capability.
- Tune Ups!
- Replacing worn out linkage to limit Hysteresis.

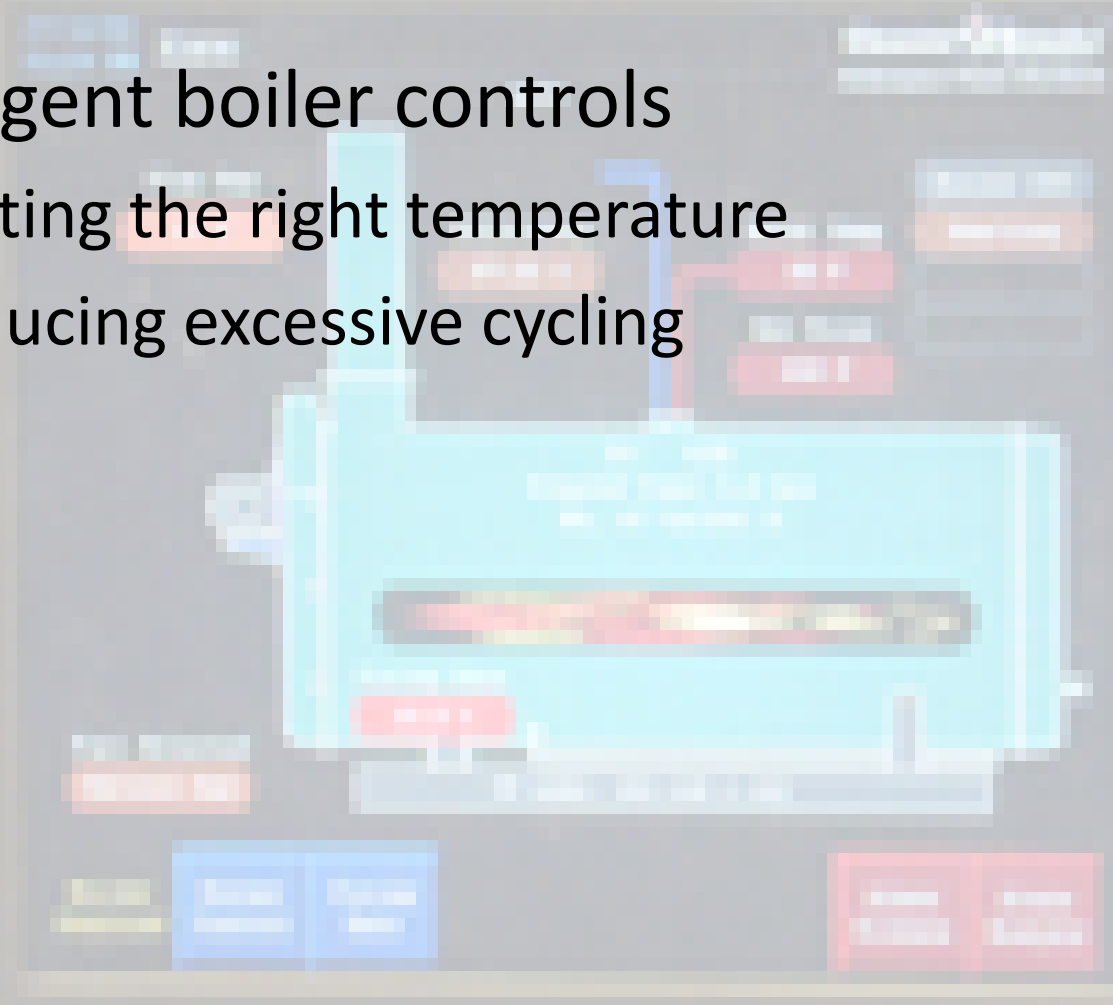
03.16.2010

Repairing and Making New

- Replacing burner Components to maximize the Burner Capability.
- Tune Ups!
- Replacing worn out linkage to limit Hysteresis.
- Repairing Traps and Condensate Return Systems
 - Installing VCR and lowering steam pressure!

Better Control – Better Efficiency

- Intelligent boiler controls
 - Getting the right temperature
 - Reducing excessive cycling

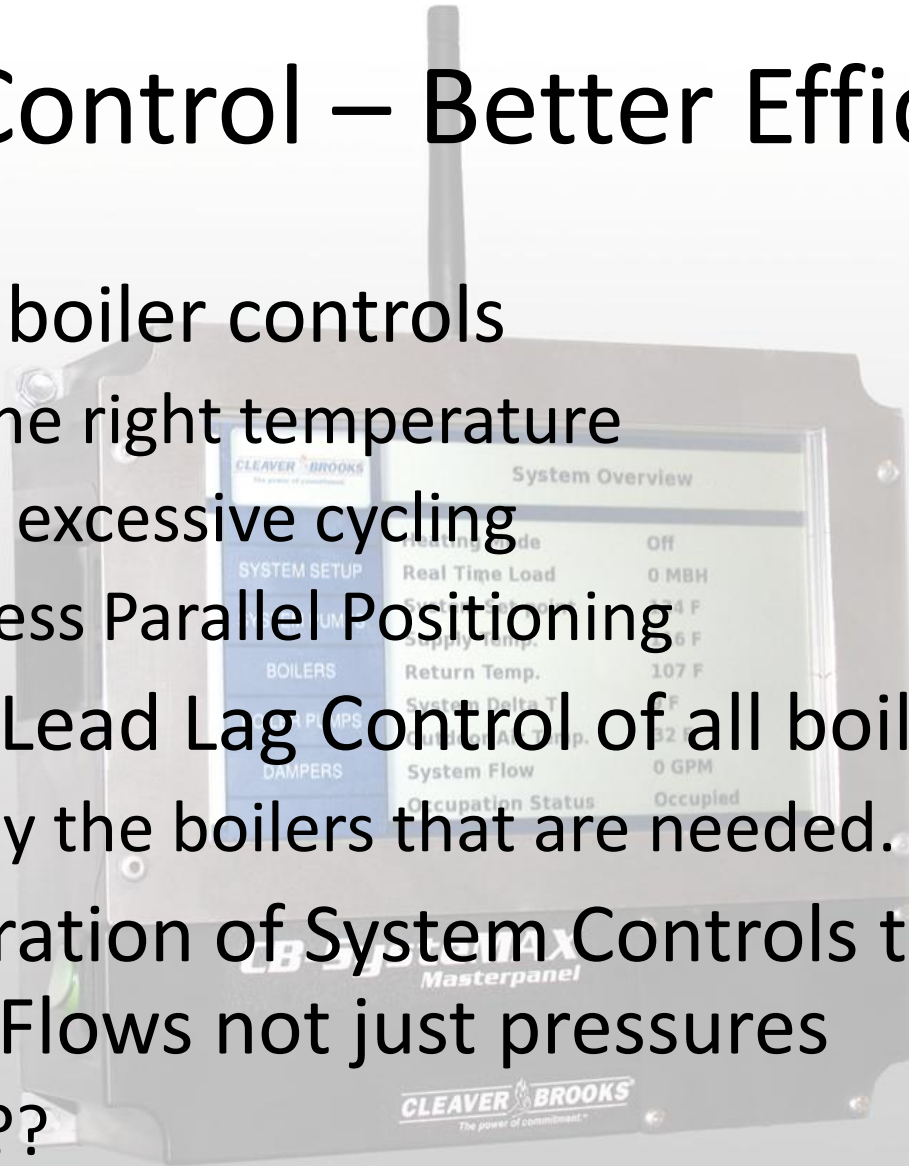


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- Electronic Lead Lag Control of all boilers
 - Firing only the boilers that are needed.

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- Next generation of System Controls to monitor BTU's and Flows not just pressures
 - Wireless??



EGA Front view - 10.4"VGA full colour touchscreen

Better Control – Better Efficiency

AUTOFLAME

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- Electronic Lead Lag Control of all boilers
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 - Wireless??
- Oxygen Trim for You??

Stack sampling probe and thermocouple



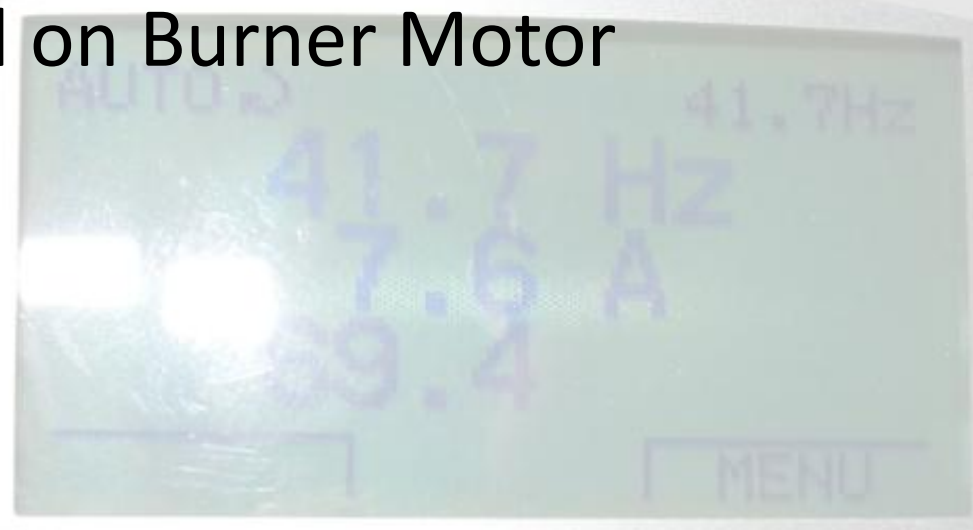
Draft Control

- Older Buildings High Stack
- Modern Boilers – Less Tolerance
- Better Combustion Control
 - Lower Stack Temperature
 - Better Turndown??



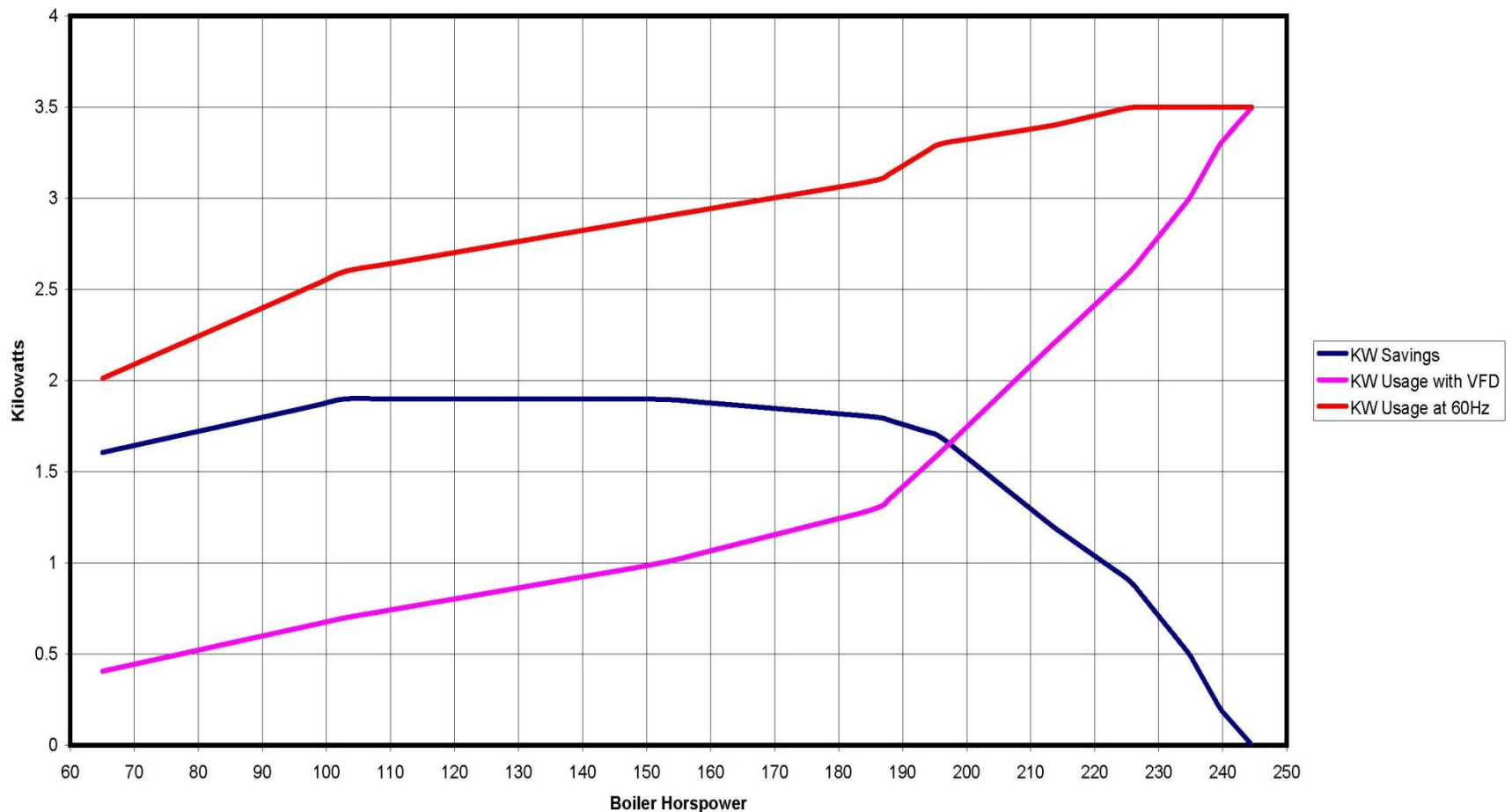
Don't Forget Electrical

- VSD Control on Burner Motor



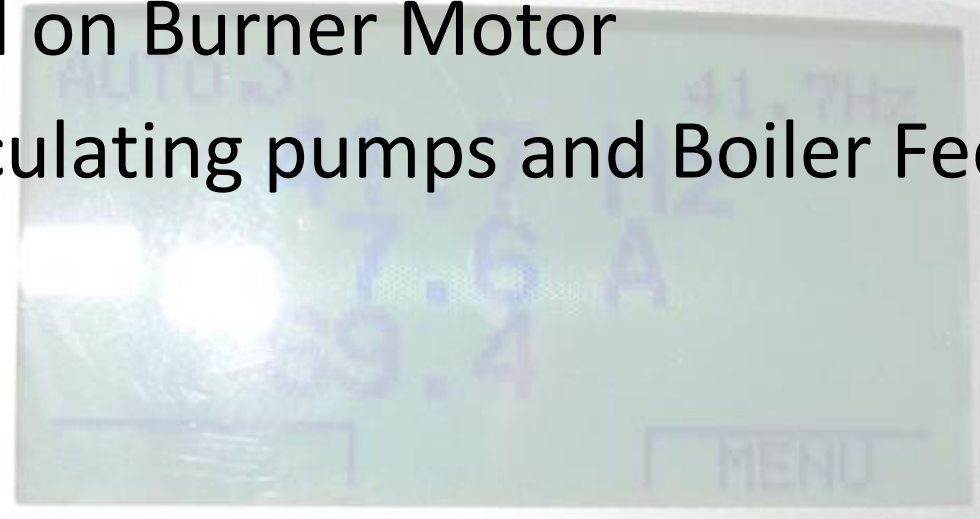
Don't Forget Electrical

Blower Motor Power Savings at Different Fring Rates
Motor at Full Speed vs Using VFD Speed Control
250 HP Firetube Boiler - 7.5 HP Blower Motor



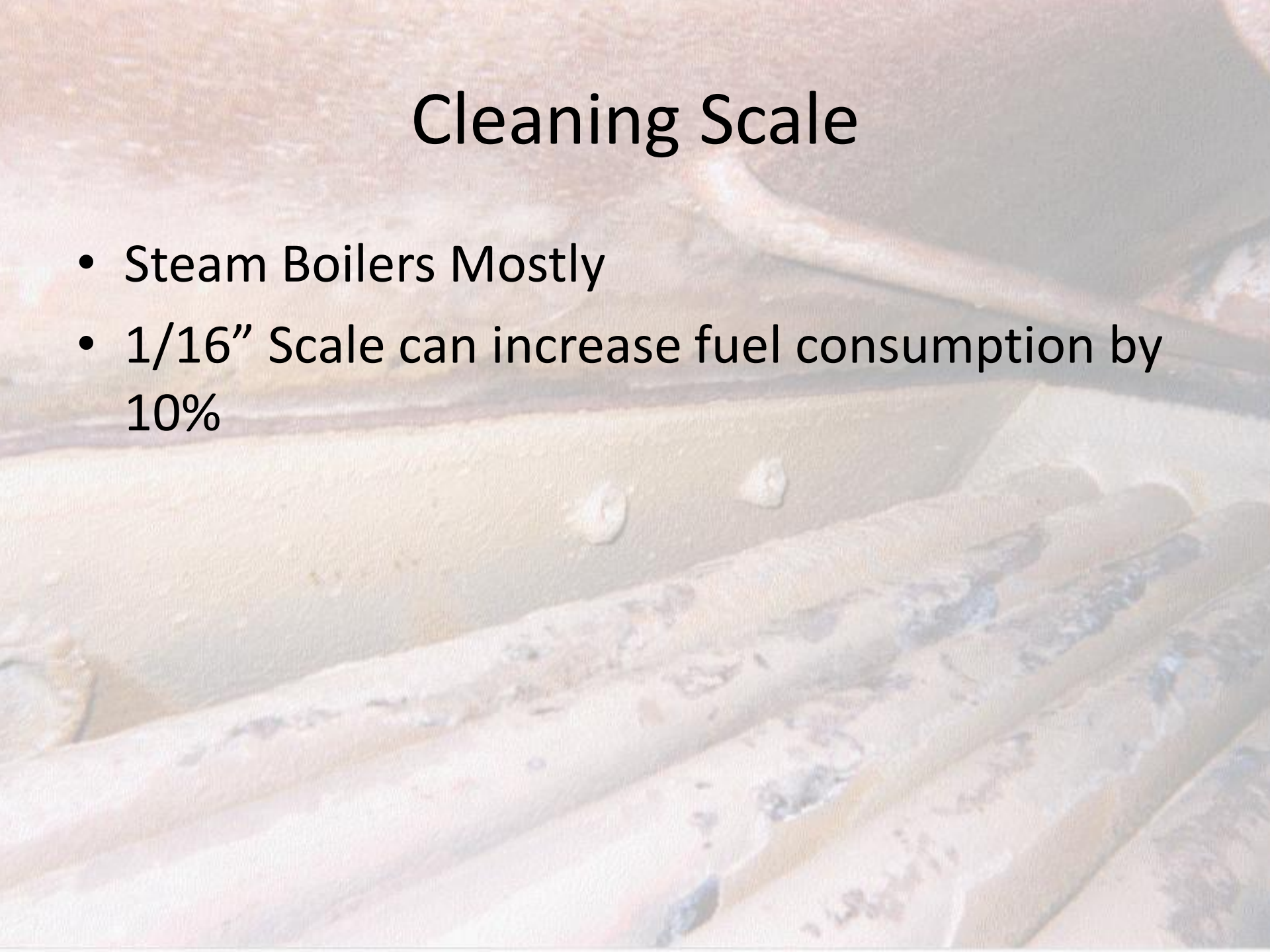
Don't Forget Electrical

- VSD Control on Burner Motor
- VSD On Circulating pumps and Boiler Feed Pumps



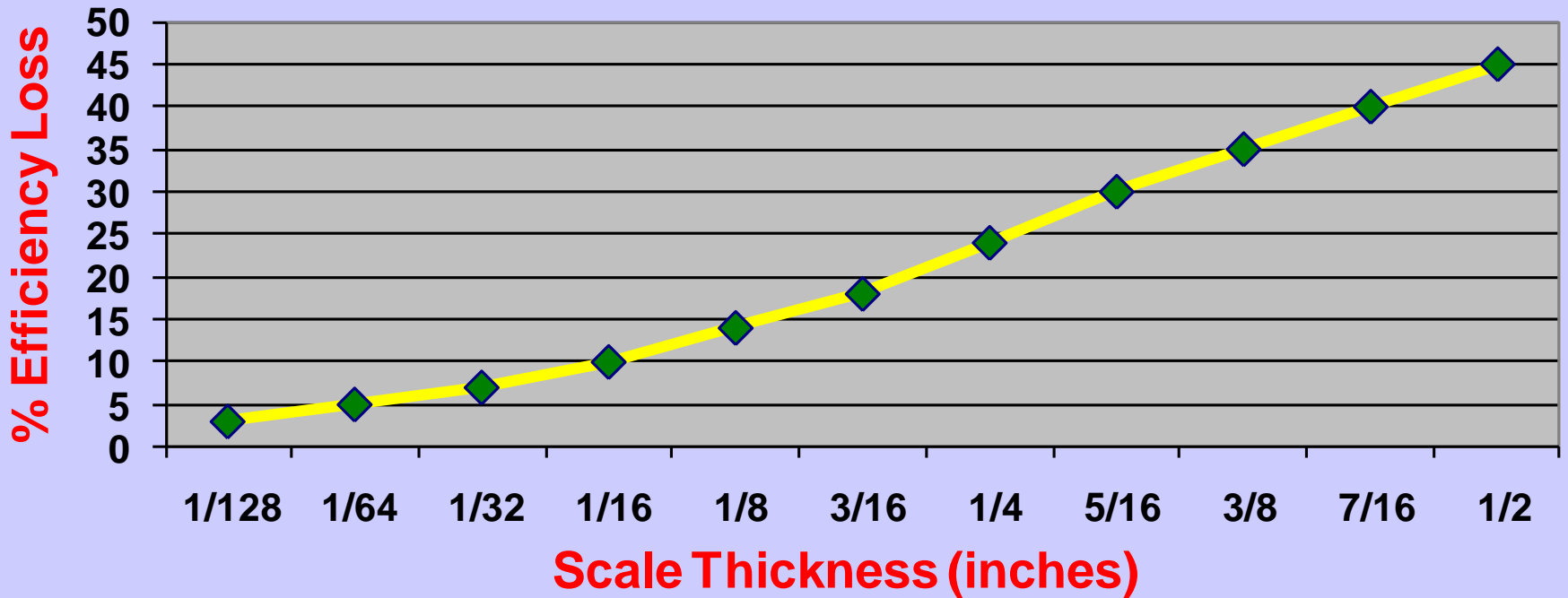
Cleaning Scale

- Steam Boilers Mostly
- 1/16" Scale can increase fuel consumption by 10%



Cleaning Scale

% Boiler Efficiency Loss Due to Scaling



New Burners



- Providing Better Combustion Efficiency
- Provide Better Turndown
- Provide Better Control
- Savings from 1% up to 10% depending on the application.

New Burners

- Can be just as effective on older Fire-Tube boilers.

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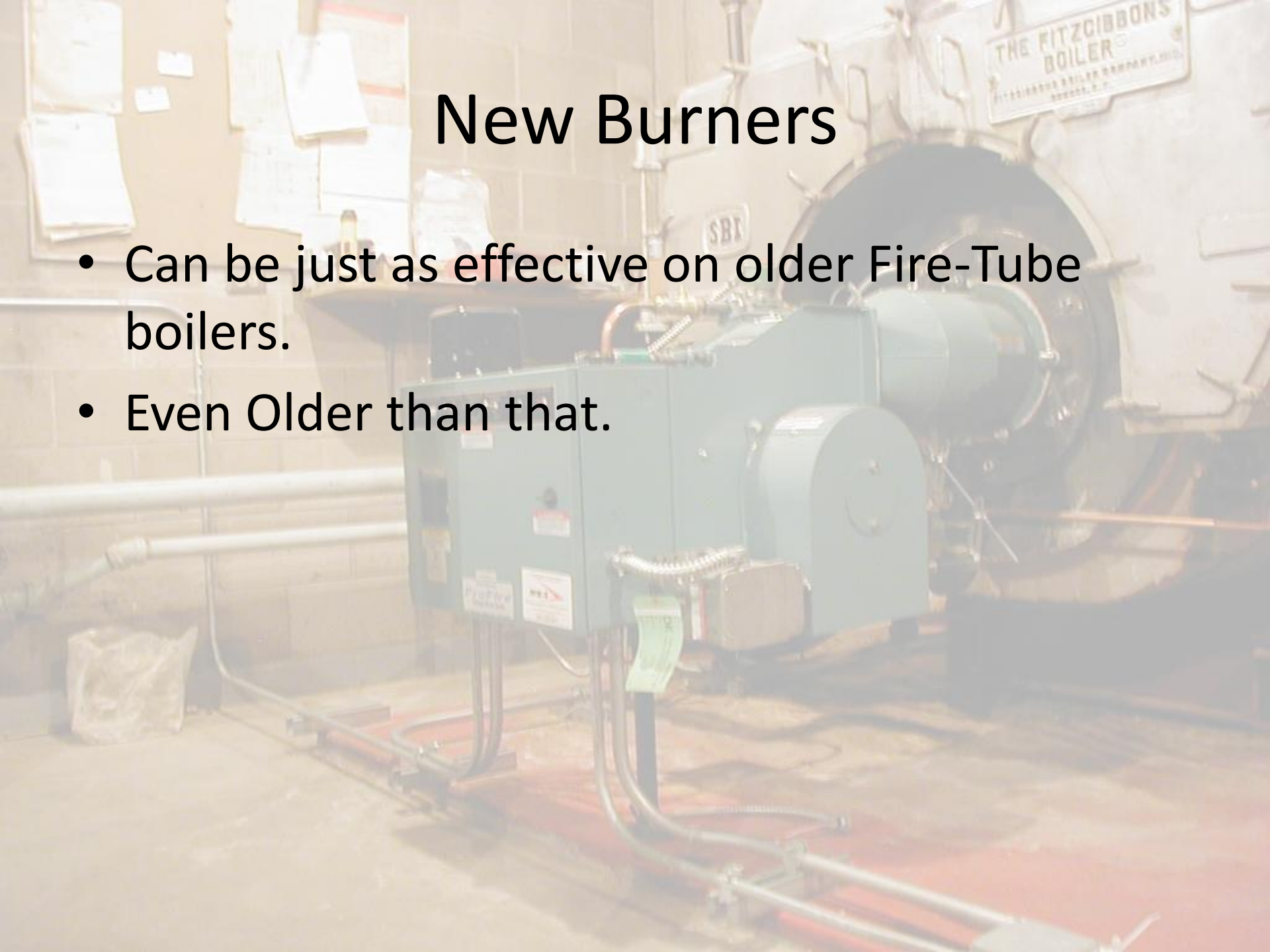
New Burners

	Original Burner Performance	New Burner Performance
Oxygen	7.1%	3.0%
Stack Temp	242	219
Turndown	2.1 : 1	4:1
Combustion Efficiency	85.8	87.2

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New Burners

- Can be just as effective on older Fire-Tube boilers.
- Even Older than that.



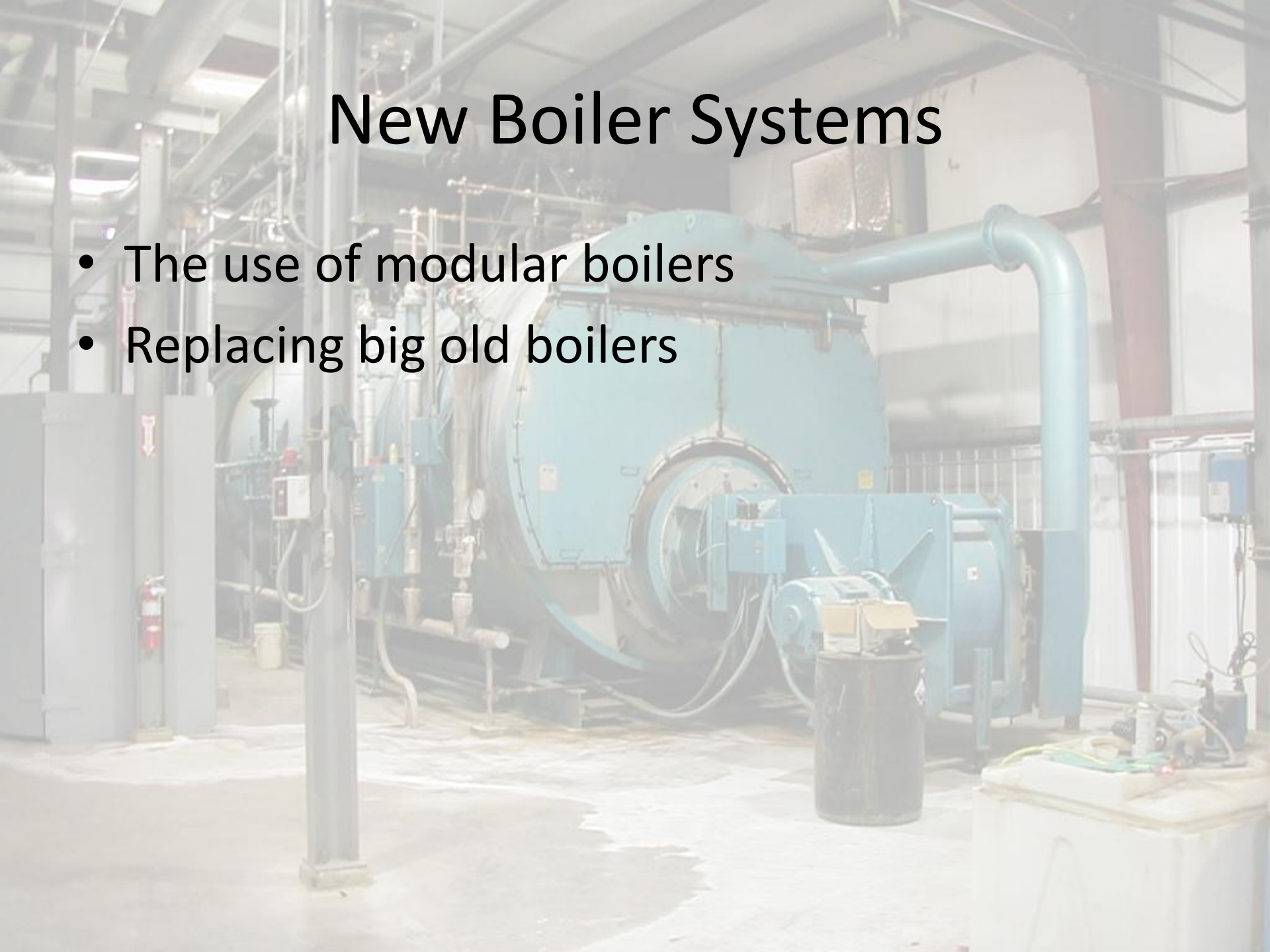
New Boiler Systems

A photograph of a utility room containing a row of modular boiler units. The units are light blue or teal, rectangular, and arranged in a line on a concrete floor. Each unit has a control panel on top with some red indicators. The room has white pipes and ceiling lights. A large white pipe is visible on the right side of the frame.

- The use of modular boilers
 - Lighter loads use less boiler
 - Modulated Firing best for load control
 - On-Off firing of stages limits control

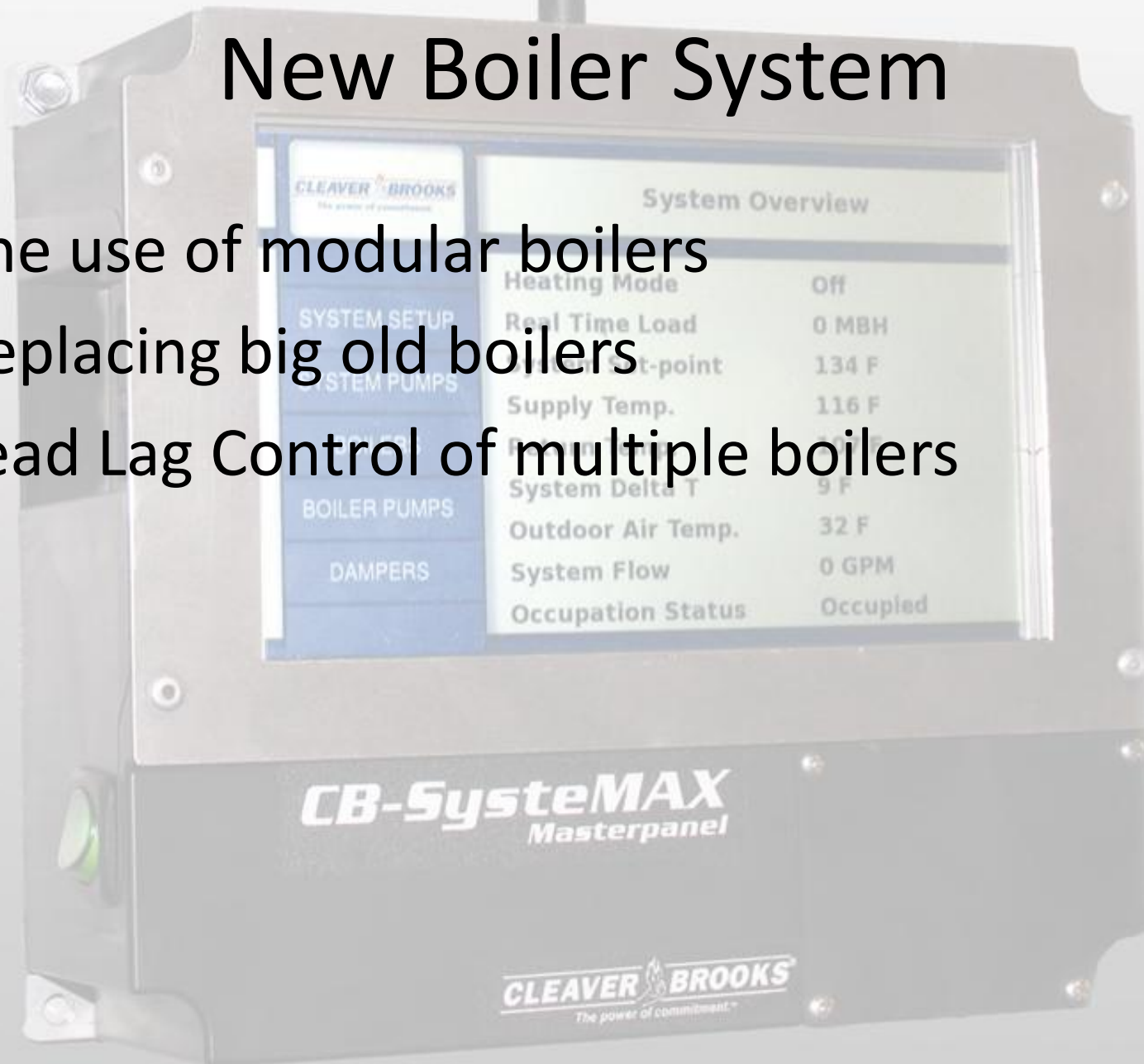
New Boiler Systems

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- Replacing big old boilers



New Boiler System

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- Replacing big old boilers
- Lead Lag Control of multiple boilers

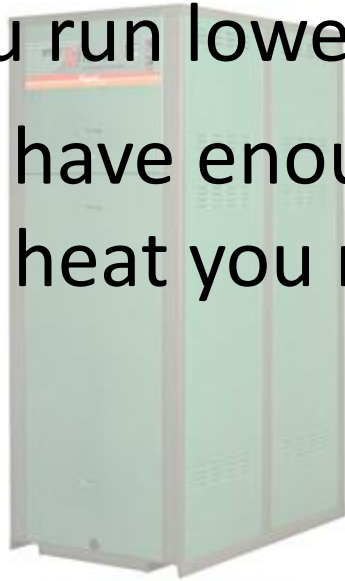


New Boiler System

- The use of modular boilers
- Replacing big old boilers
- Lead Lag Control of multiple boilers
- Run the small boiler first

Condensing Boilers, When?

- Can you run lower temperature in the loop
- Do you have enough radiation in the system to get the heat you need and the efficiency you want.



Think Green



Think Raypak

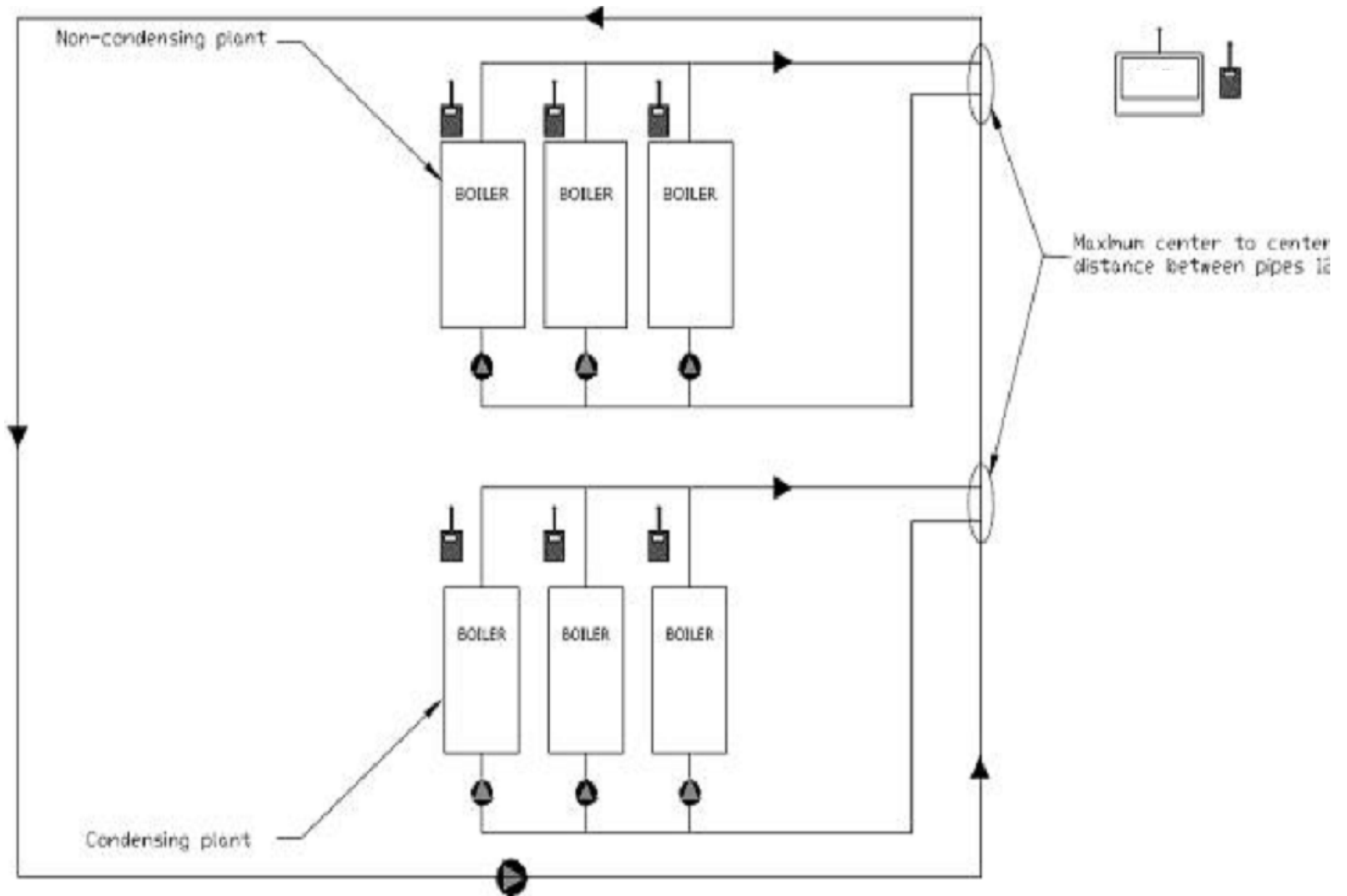


Hybrid Systems

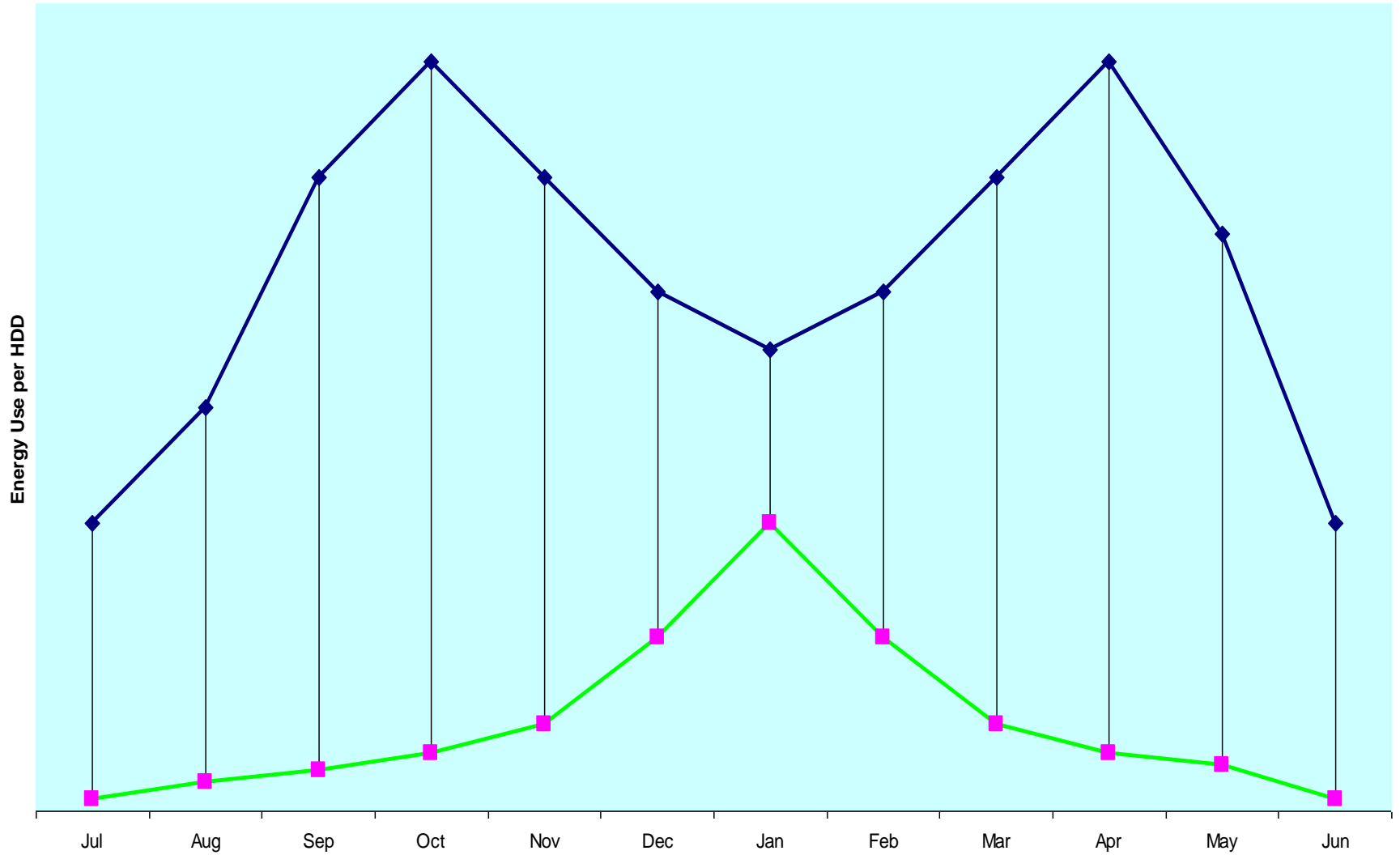
- Using the best of both worlds
- Stand by fuel requirements
- System Control



Hybrid Systems



Hybrid Systems



Savings in the System

- Fix what you have
- Modernize what you have
- Modify what you have
- Add Efficiency to your system