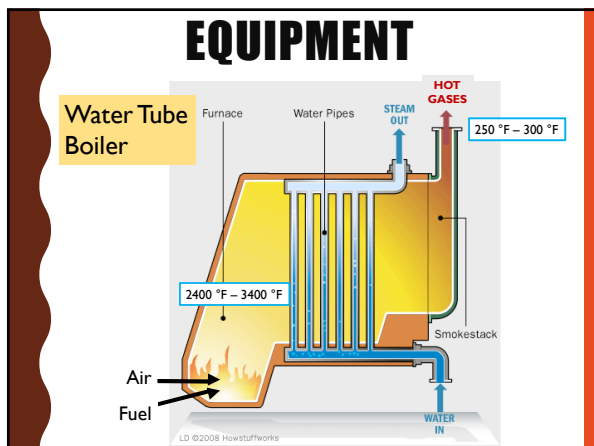


OVERVIEW

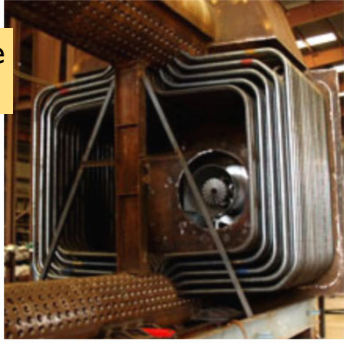
- Equipment
- Central Boilers
- Distributed Boilers
- Steam
- Hot Water
- Fuels
- Costs

The photograph shows a large industrial boiler room with various pipes, valves, and a control panel.



EQUIPMENT

Water Tube Boiler

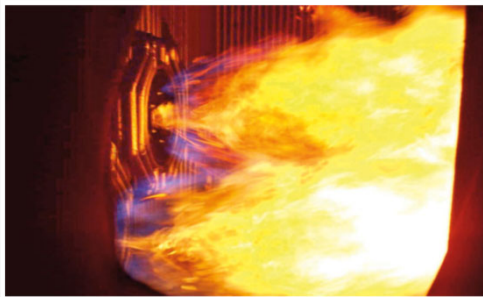


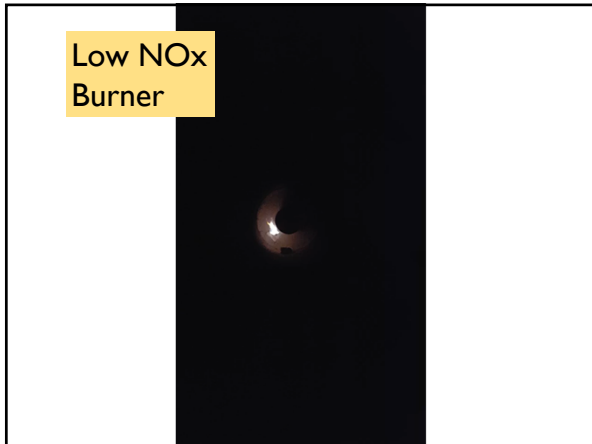
EQUIPMENT

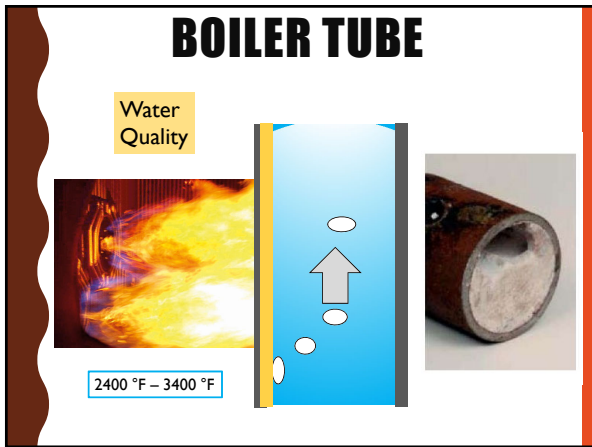


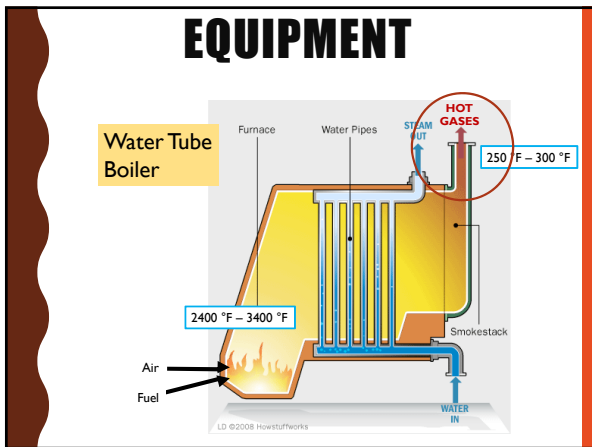
EQUIPMENT

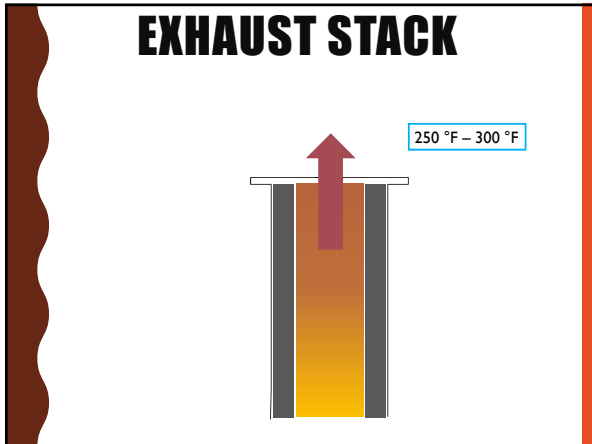
Burner

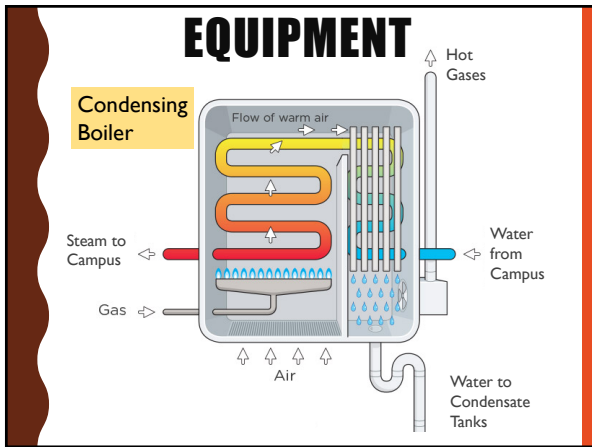


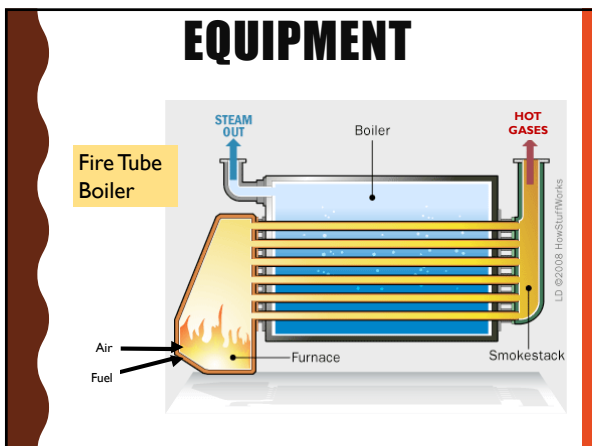


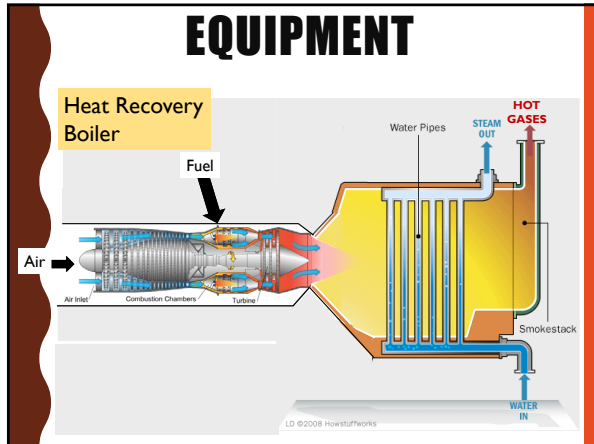


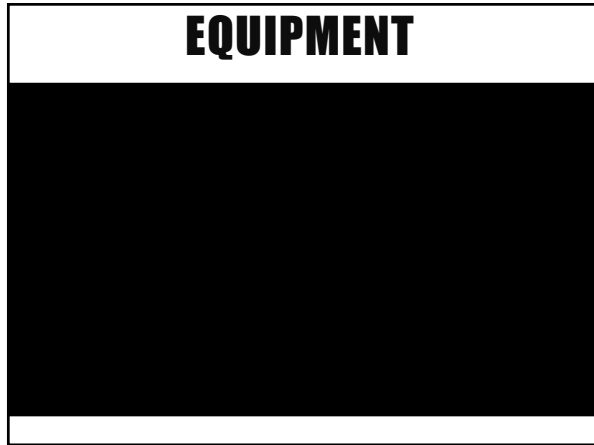


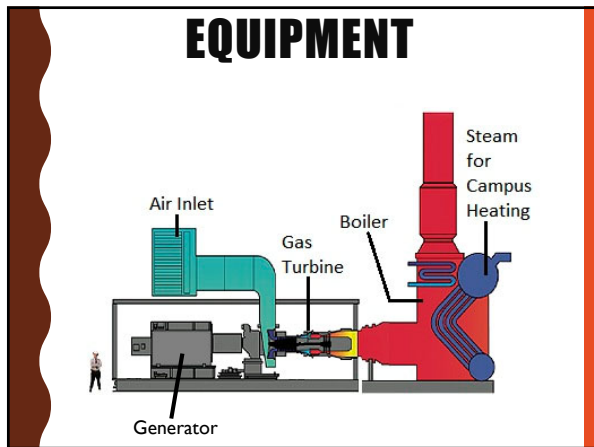












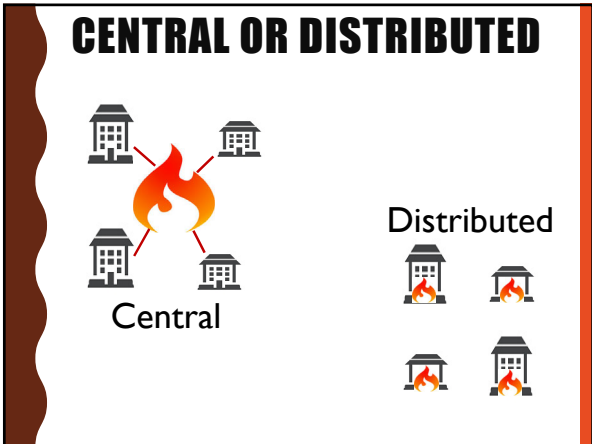




BOILER REGULATIONS

- Construction
- Repair
- Operation
- ASME Boiler and Pressure Vessel Code
- Air Permit
- Operator Licensing
- Insurance Companies

This block features a title, a small historical photograph of a factory with smoke rising from its chimneys, and a list of boiler-related regulations and codes.



CENTRAL

Pros

- Fewer but bigger boilers
- Consolidation of operations/maintenance
- Backup fuel capability
- Can last over 50 years
- Option to install Combined Heat & Power

Cons

- Requires pipe distribution
- Complex systems

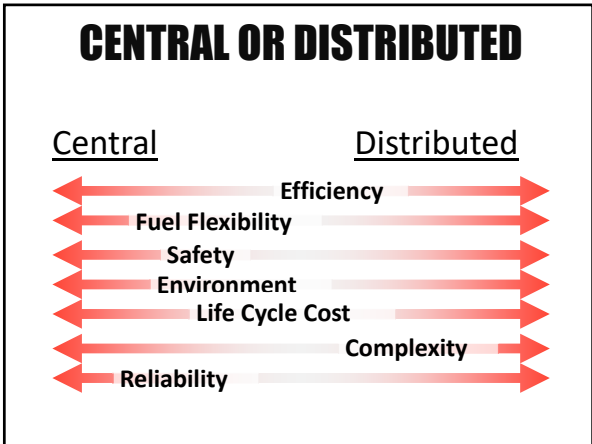
DISTRIBUTED

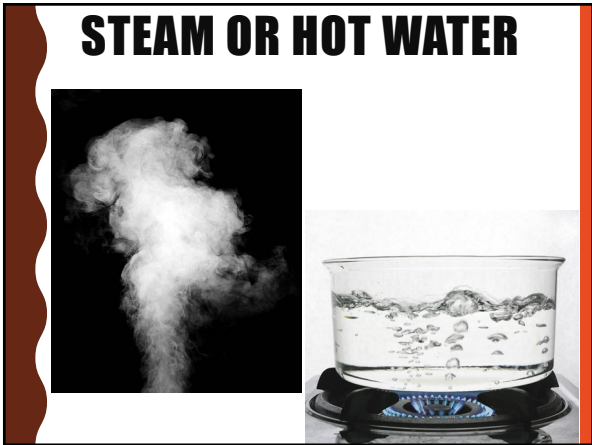
Pros

- Multiple small boilers
- Less complex systems

Cons

- Less reliable
- Limited backup fuel options
- Limited Combined Heat & Power options






STEAM OR HOT WATER

Steam has "two phase flow" - mix of gas and liquid

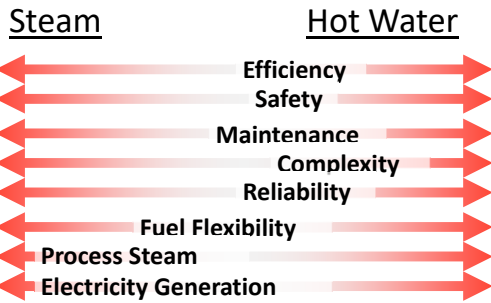
Hot Water is liquid only



WATER HAMMER

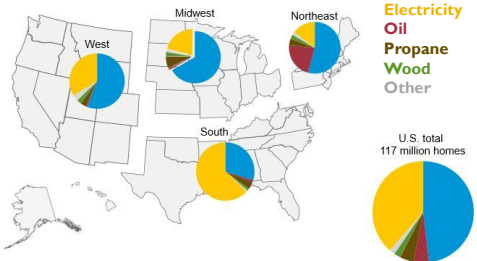


STEAM OR HOT WATER



FUELS

Share of homes by primary space-heating fuel and Census Region



Source: U.S. Energy Information Administration based on 2014 American Community Survey

HEATING COSTS

	Kentucky	New Mexico
Fuel	48%	55%
Labor & Maintenance	29%	34%
Chemicals	6%	2%
Electricity	4%	5%
Water	3%	1%
Other	10%	3%

QUESTIONS?

