



Clean Energy Demonstration Project

Biomass Boiler Project

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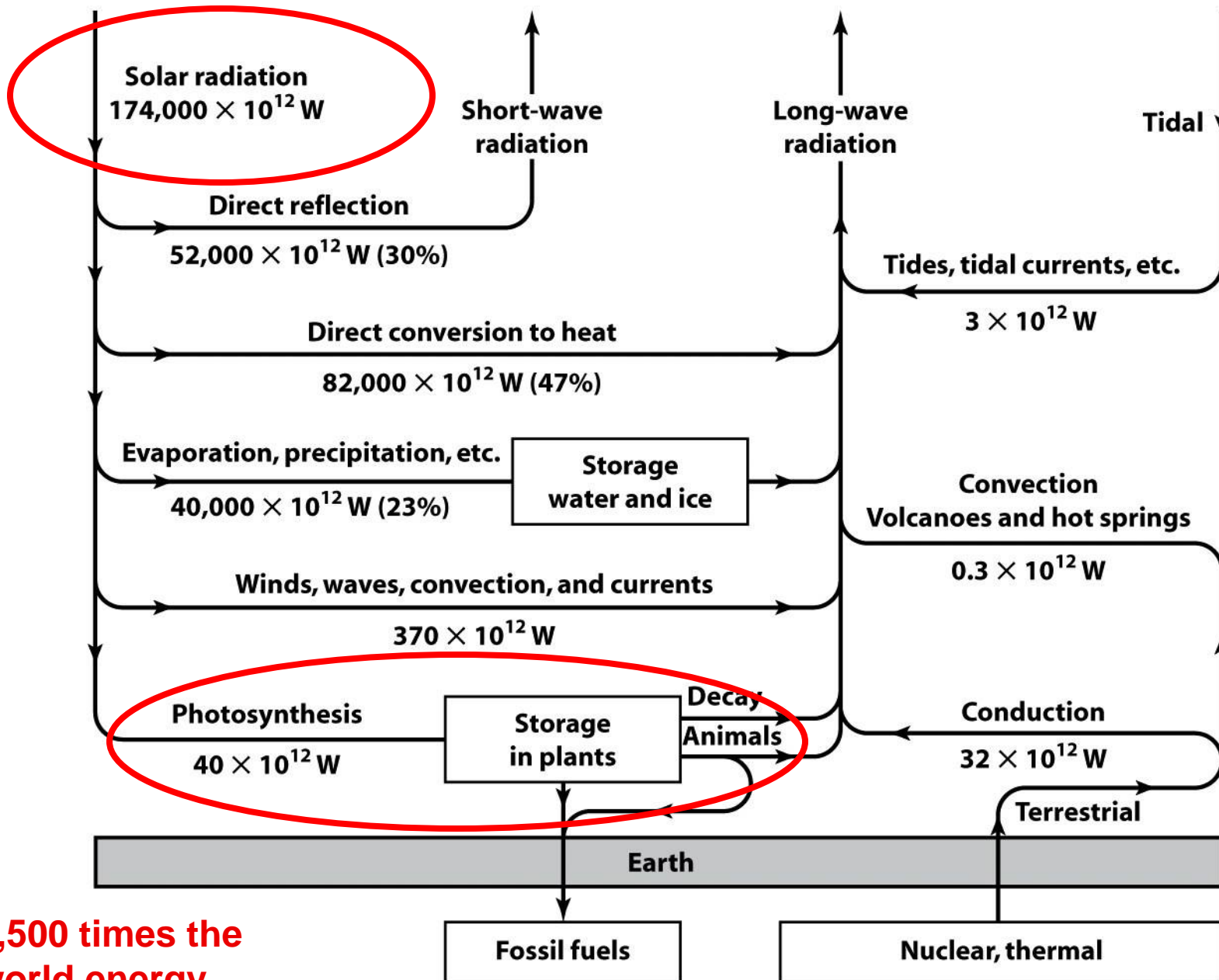
Today's Presentation

- What is biomass energy?
- Overview of a biomass boiler system
- Examples of biomass boiler installations
- Biomass feasibility & boiler selection criteria
- Biomass boiler manufacturers
- Photos of Oakland project
- Biomass economics & the Oakland project



What is biomass energy?

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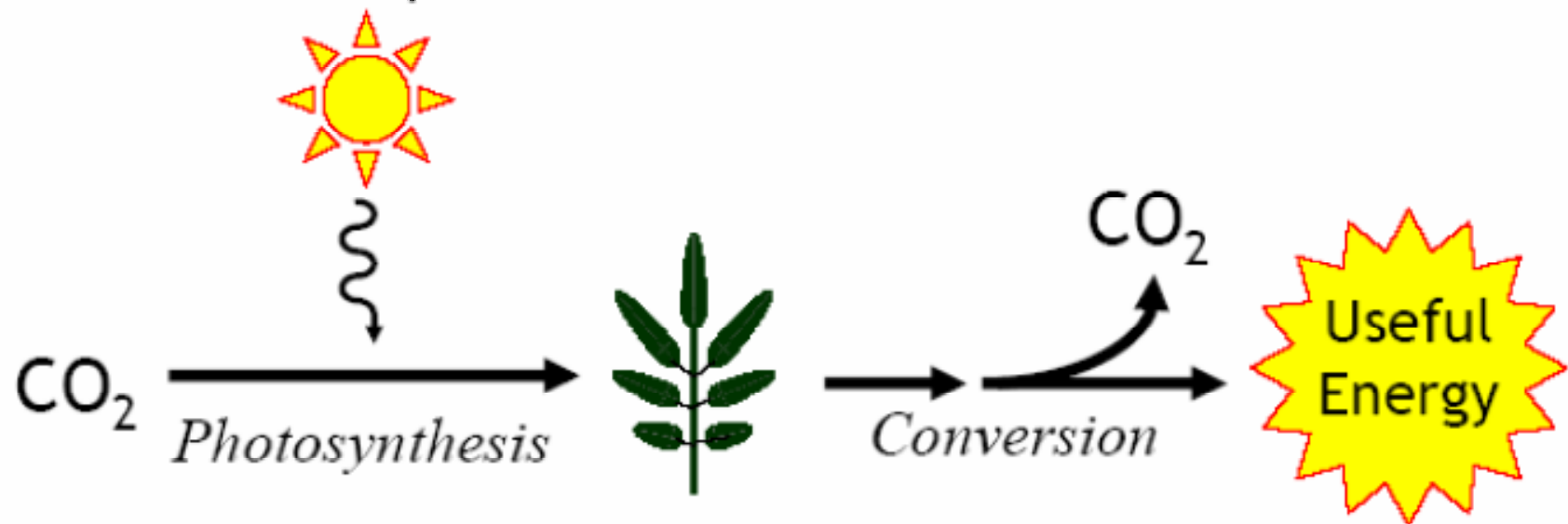


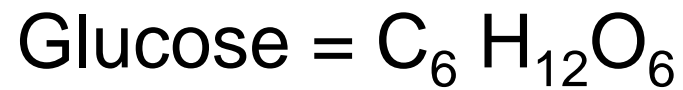
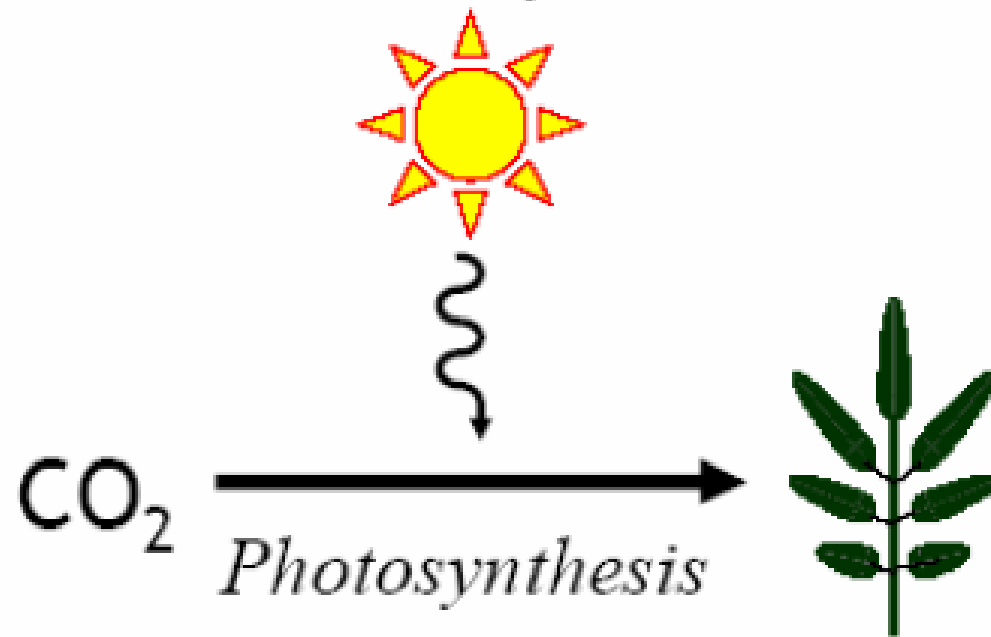
2,500 times the world energy consumption

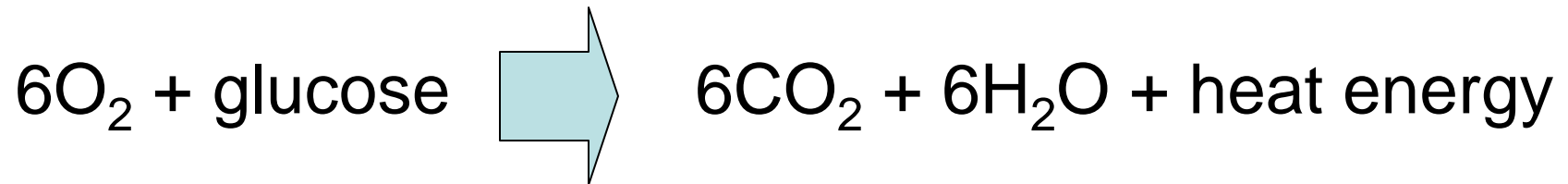
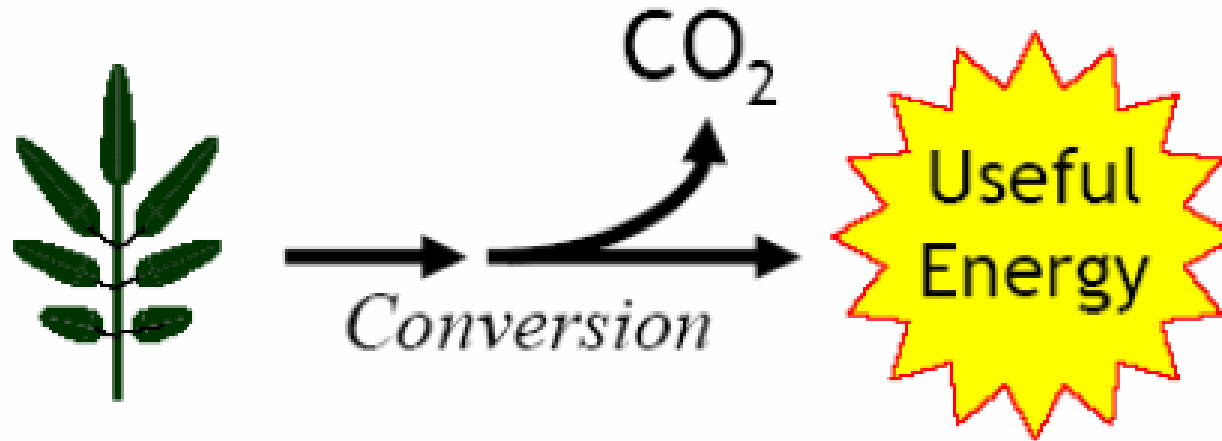
Photosynthesis: Nature has found a way to convert sunlight, CO₂, water and nutrients into chemical energy



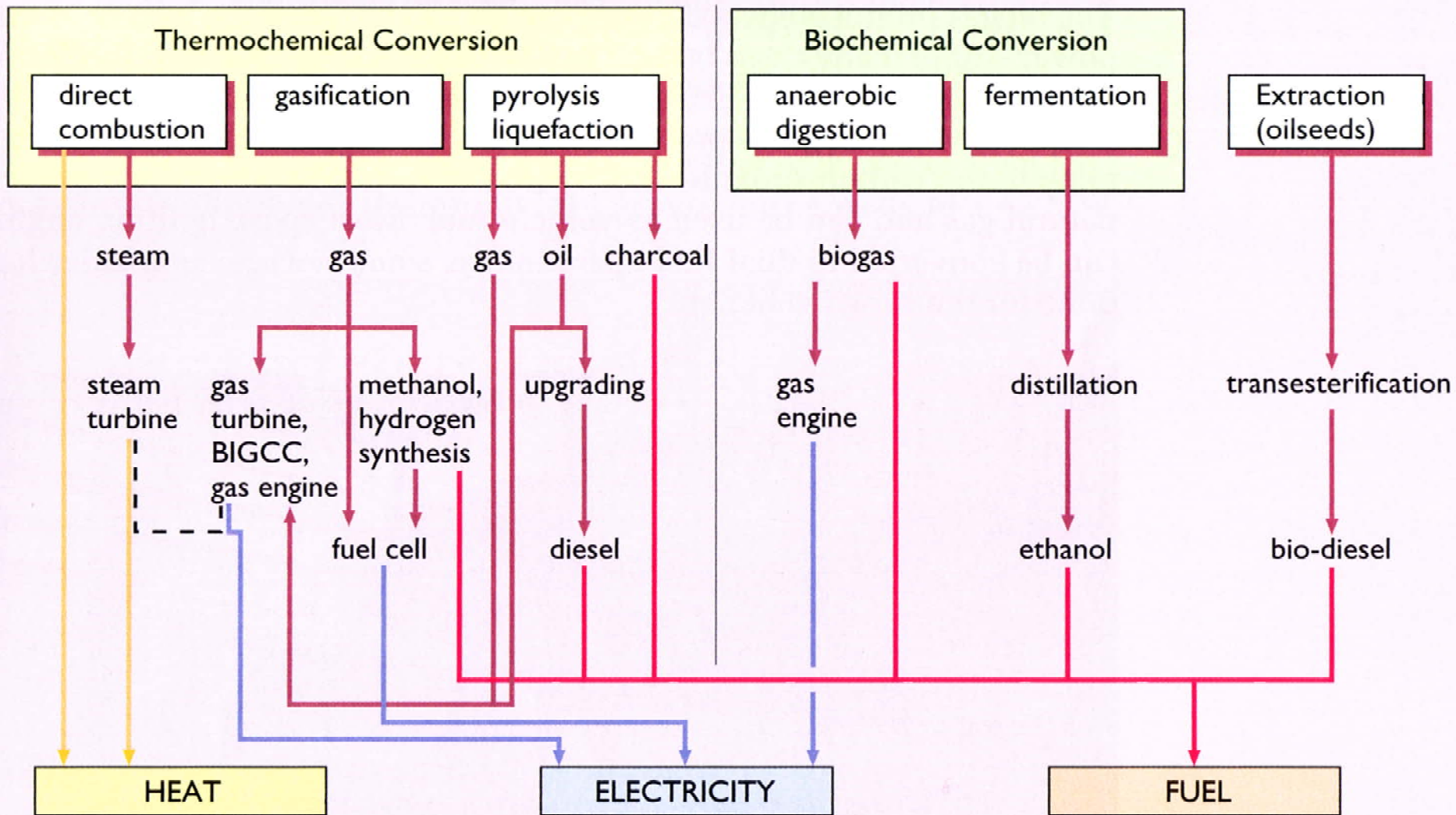
Biomass Starts with Photosynthesis







... also called combustion, oxidation, biodegradation
... chemical bonds in glucose are broken

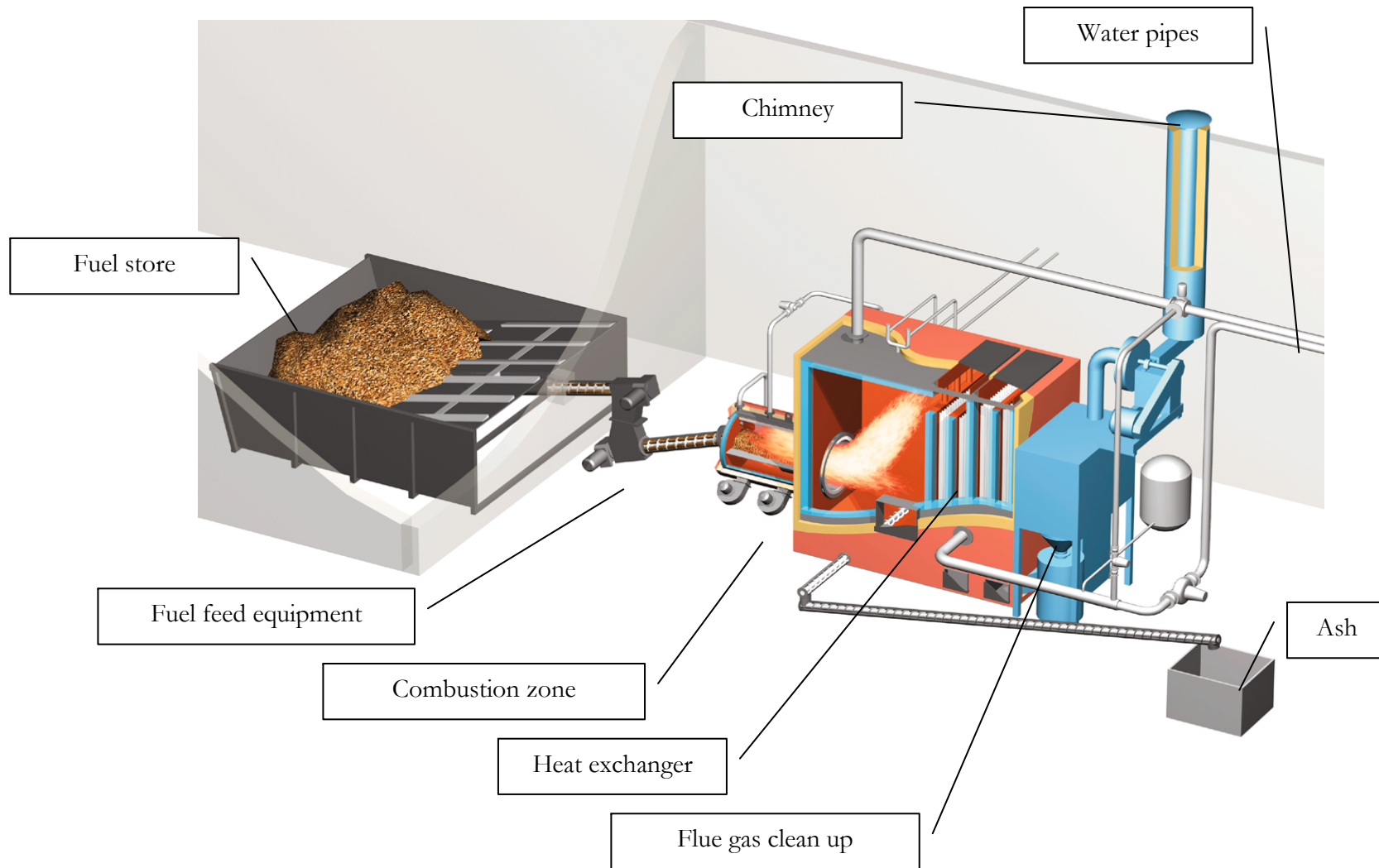




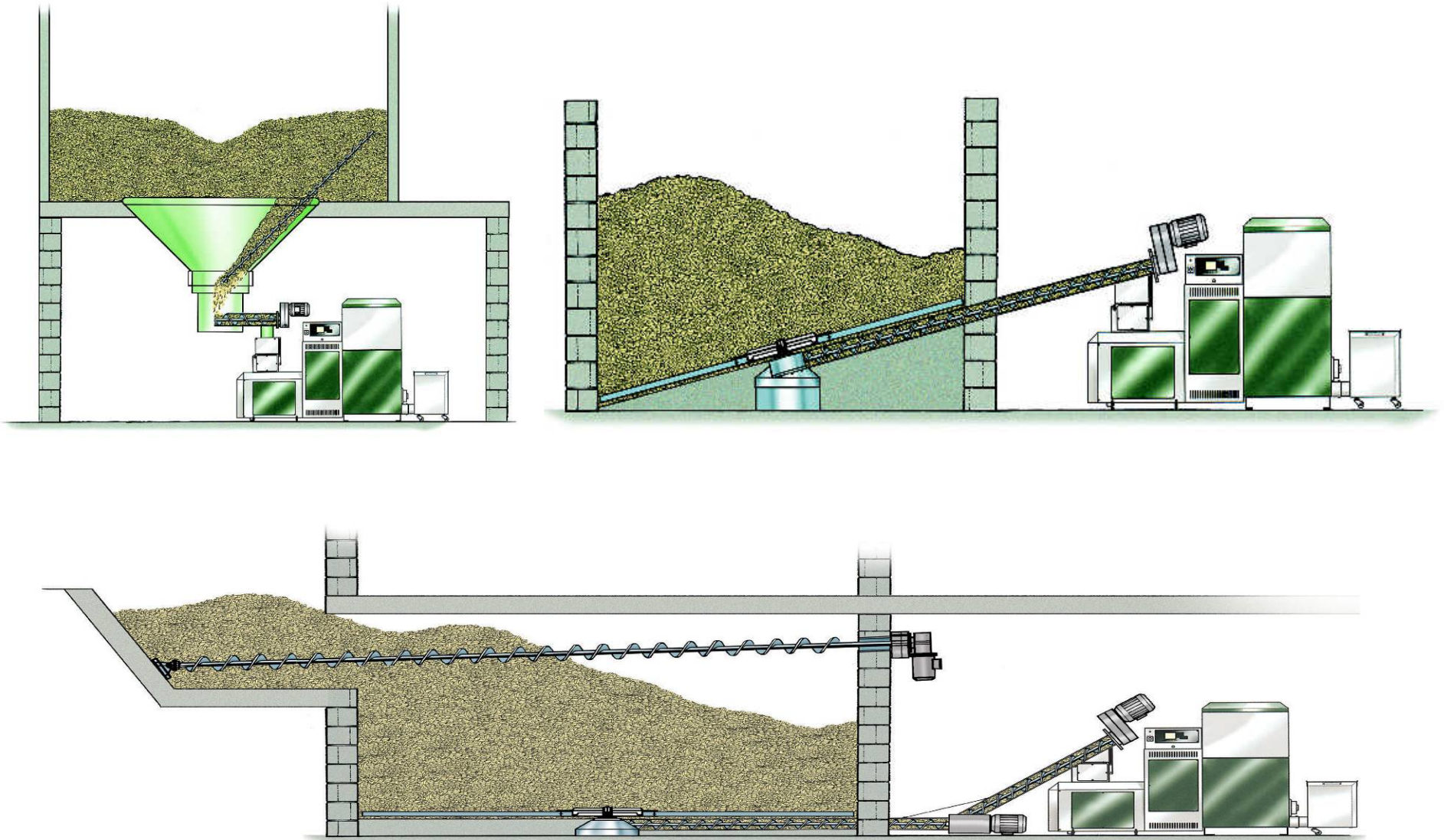
Overview of a biomass boiler system

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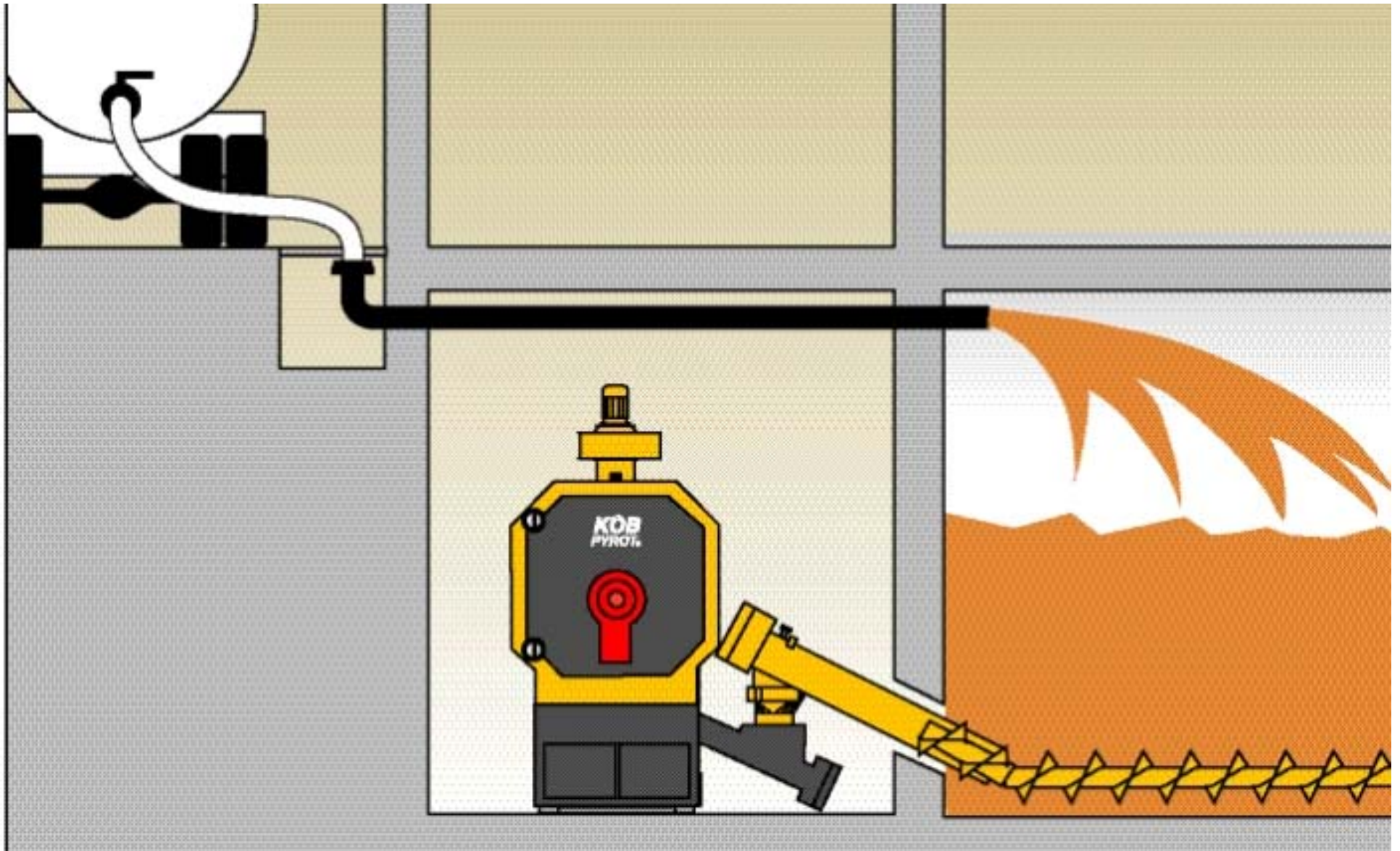
Auto Feed - System Components



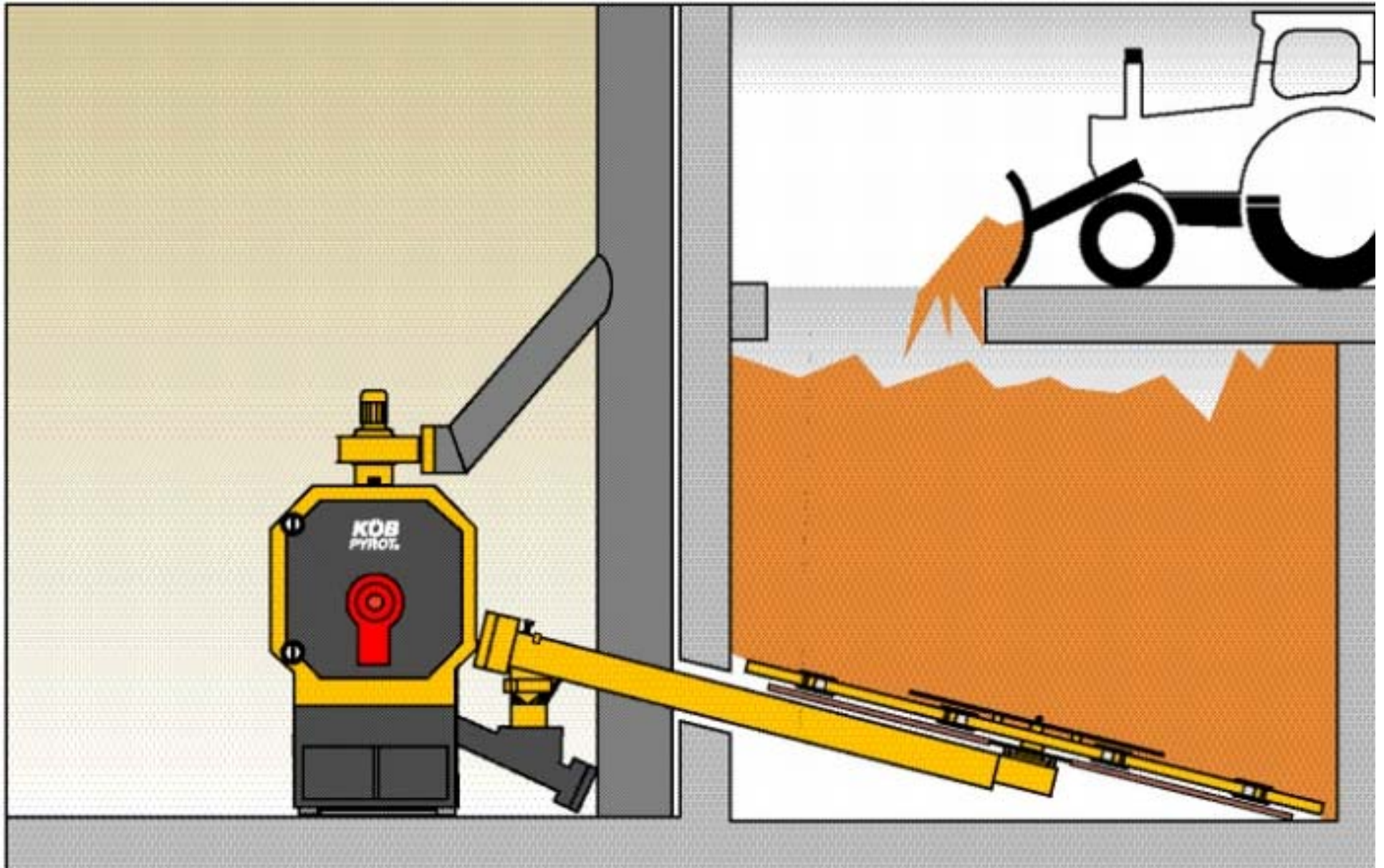
Wood Chip Storage Options



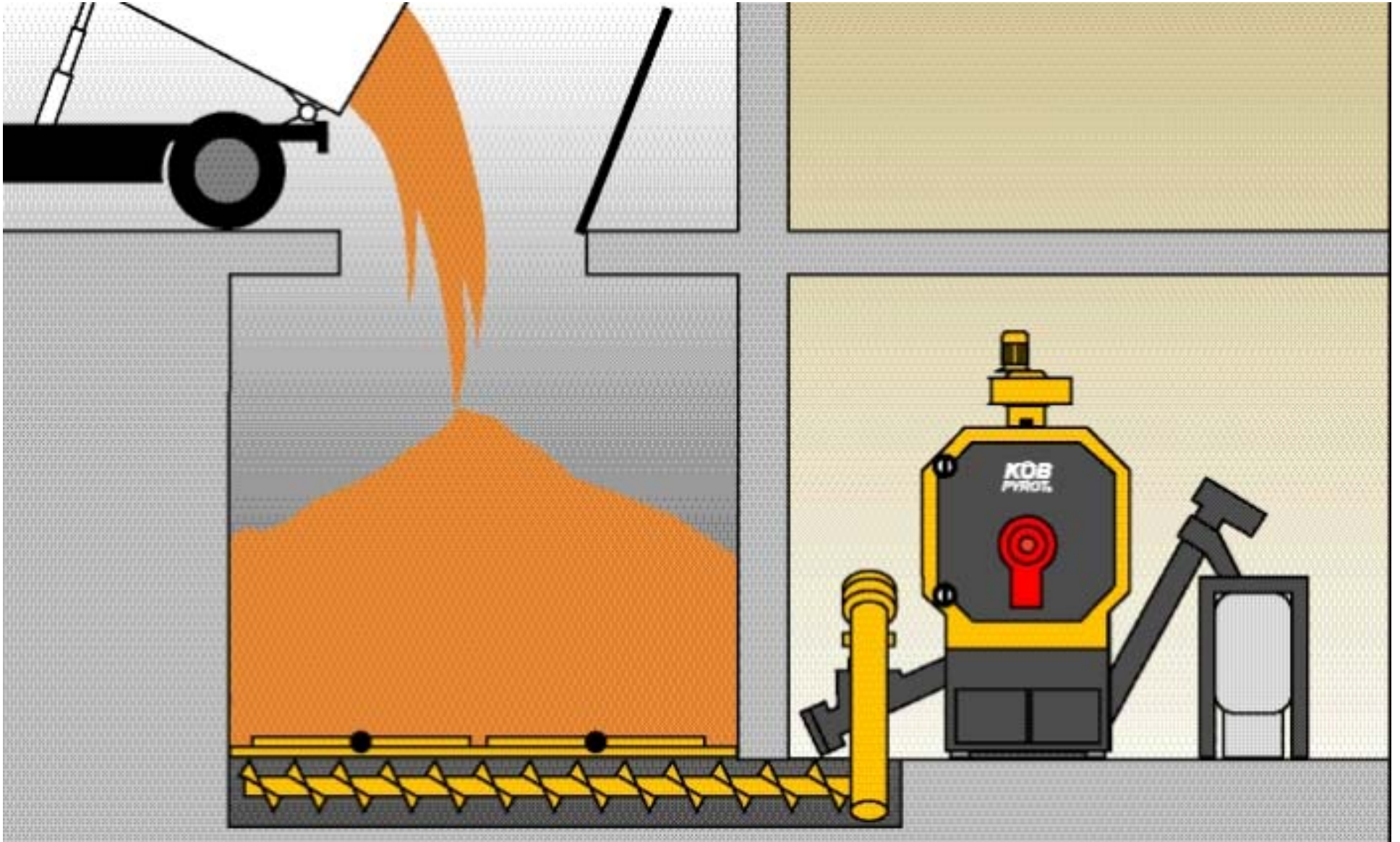
Pneumatically blowing in pellets into a room inside the building



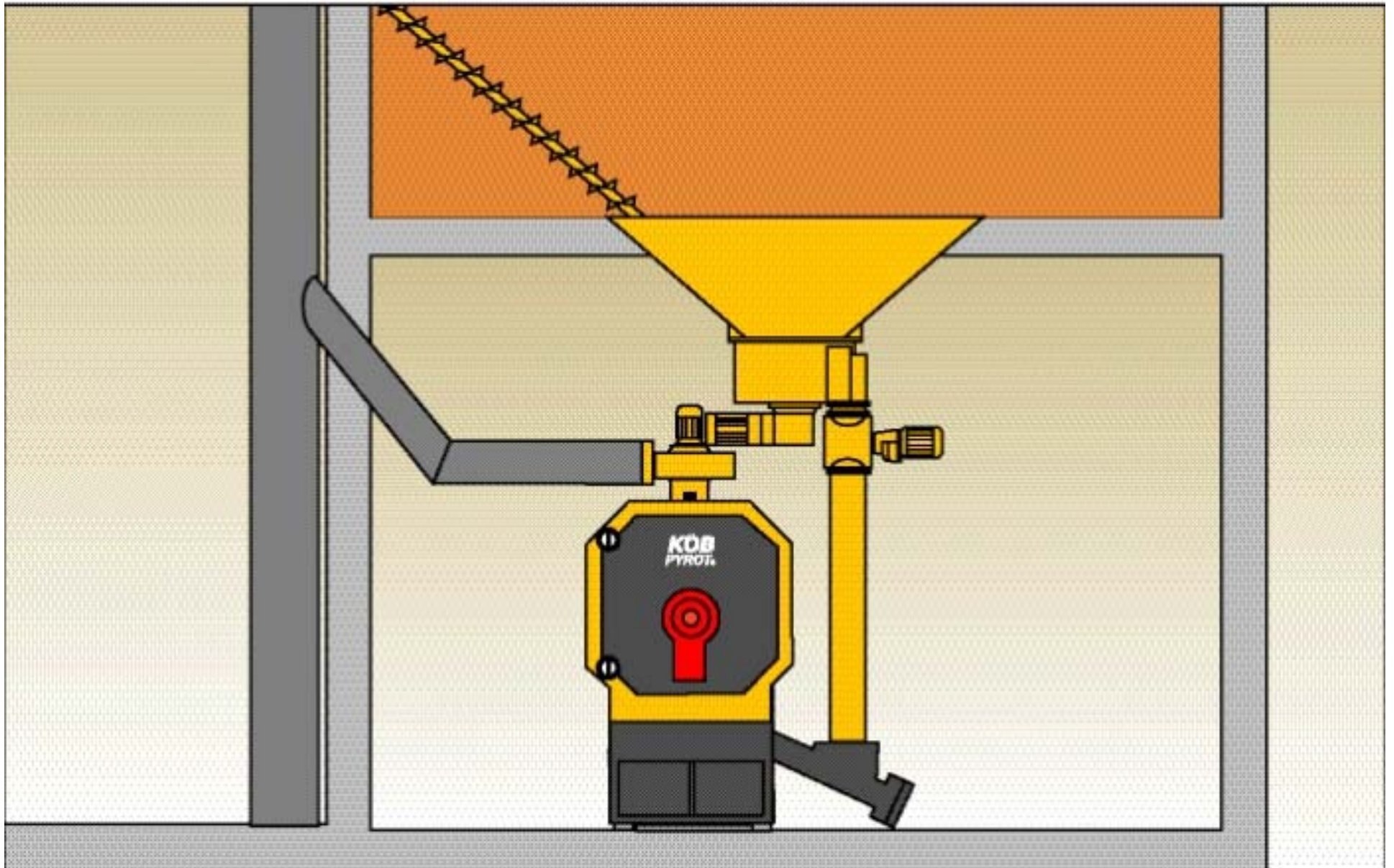
Filling small bunkers from the top



Filling large bunkers from the top



Silo storage above the boiler room





Examples of biomass boiler installations

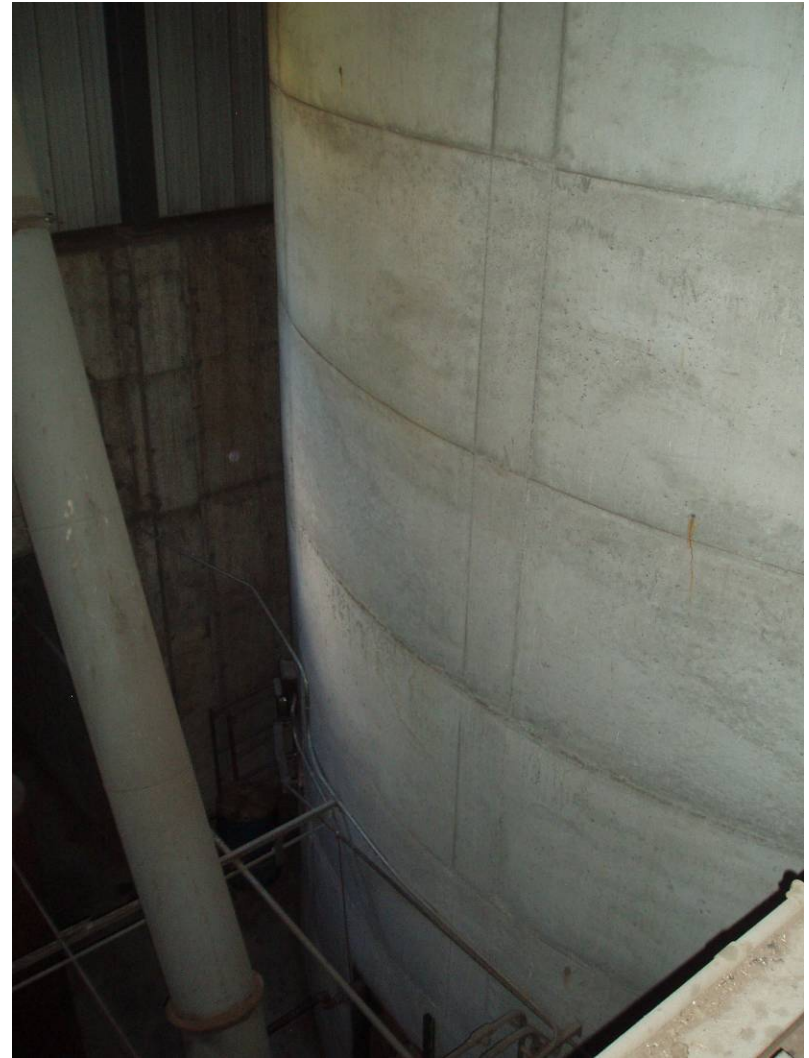
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Central Michigan University Wood Chip Boiler Operations



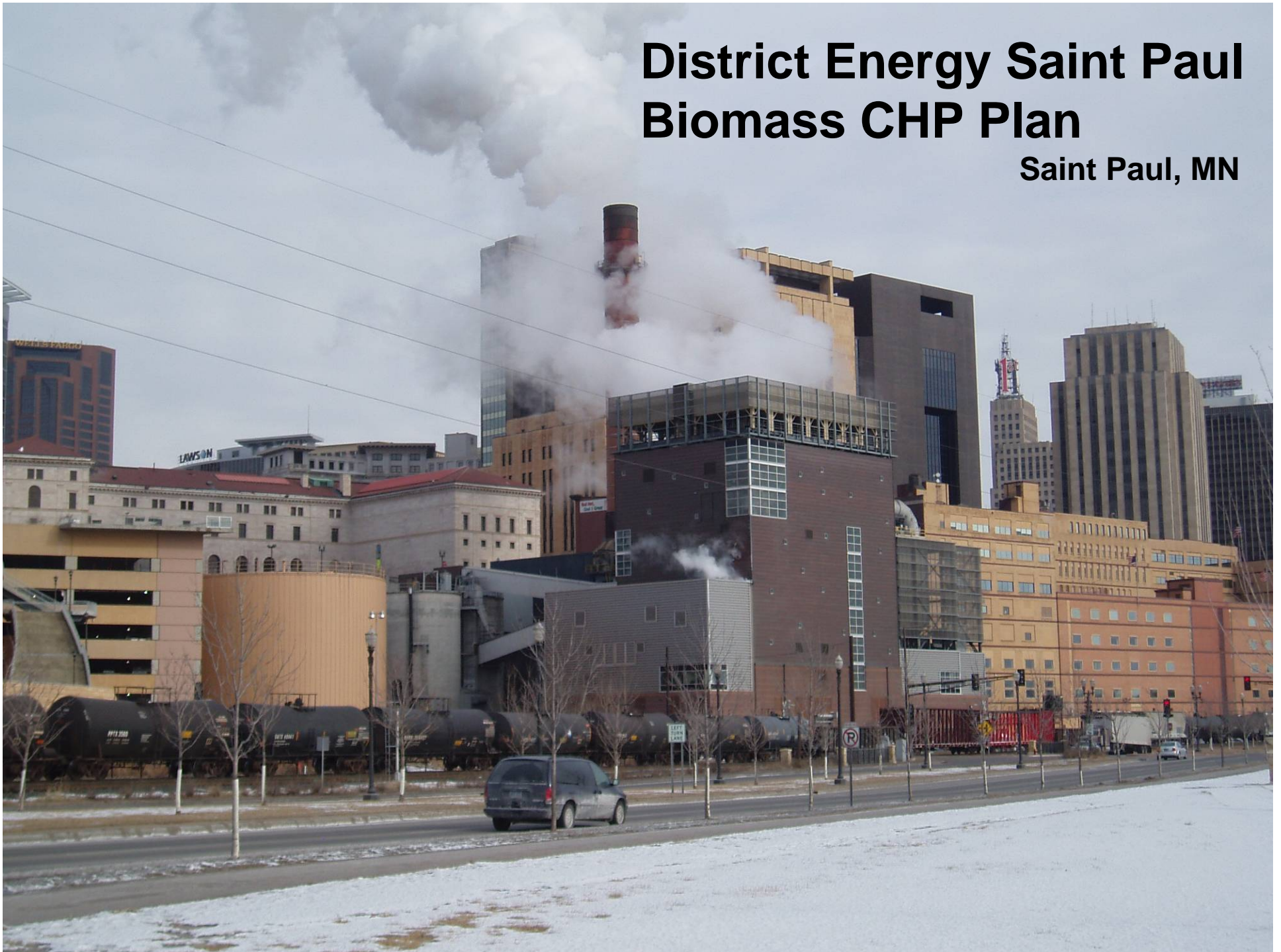






District Energy Saint Paul Biomass CHP Plan

Saint Paul, MN





KOB Containerized Installation





Oakland University Wood Chip Boiler Project

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FINK
MACHINE INC.



Johnson & Wood
MECHANICAL CONTRACTORS

KOB

VIESMANN

METRO
CONTROLS, INC.

MATRIX
CONSULTING ENGINEERS, INC.

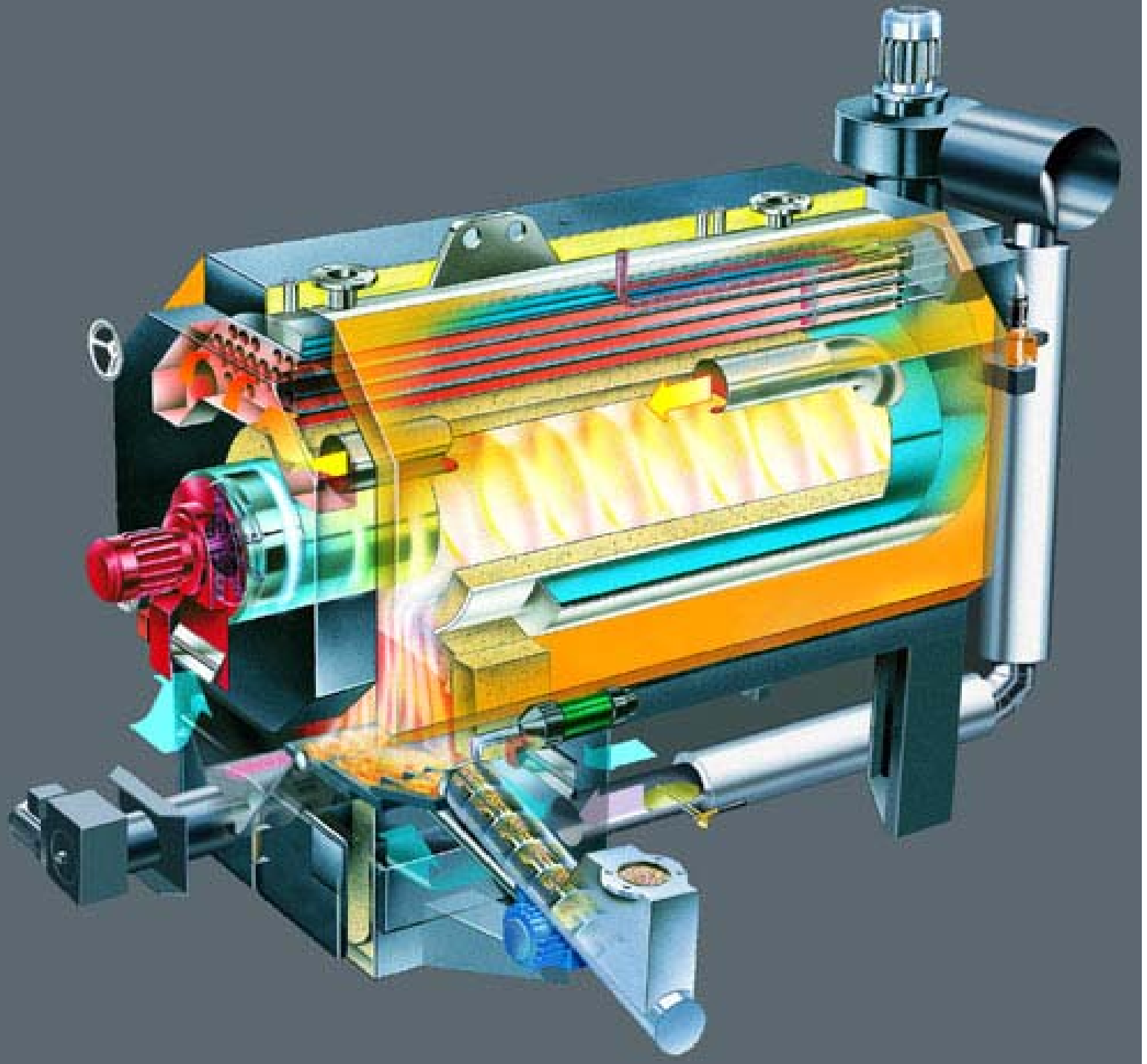


U.S. DEPARTMENT OF
ENERGY



- Phase 1
 - High tech wood chip boiler
 - Steam elimination (convert to HW)
 - DDC controls
 - Lighting upgrades

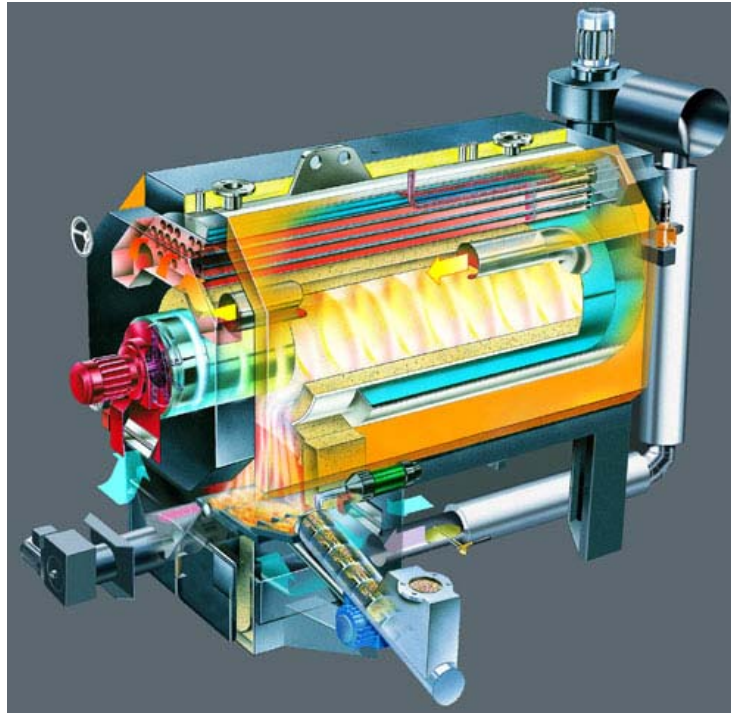
- Phase 2
 - Cooling tower replacement (or geothermal)
 - Small solar thermal installation
 - Five solar tube collectors, same construction of HHB project but at ground level for the public to view.



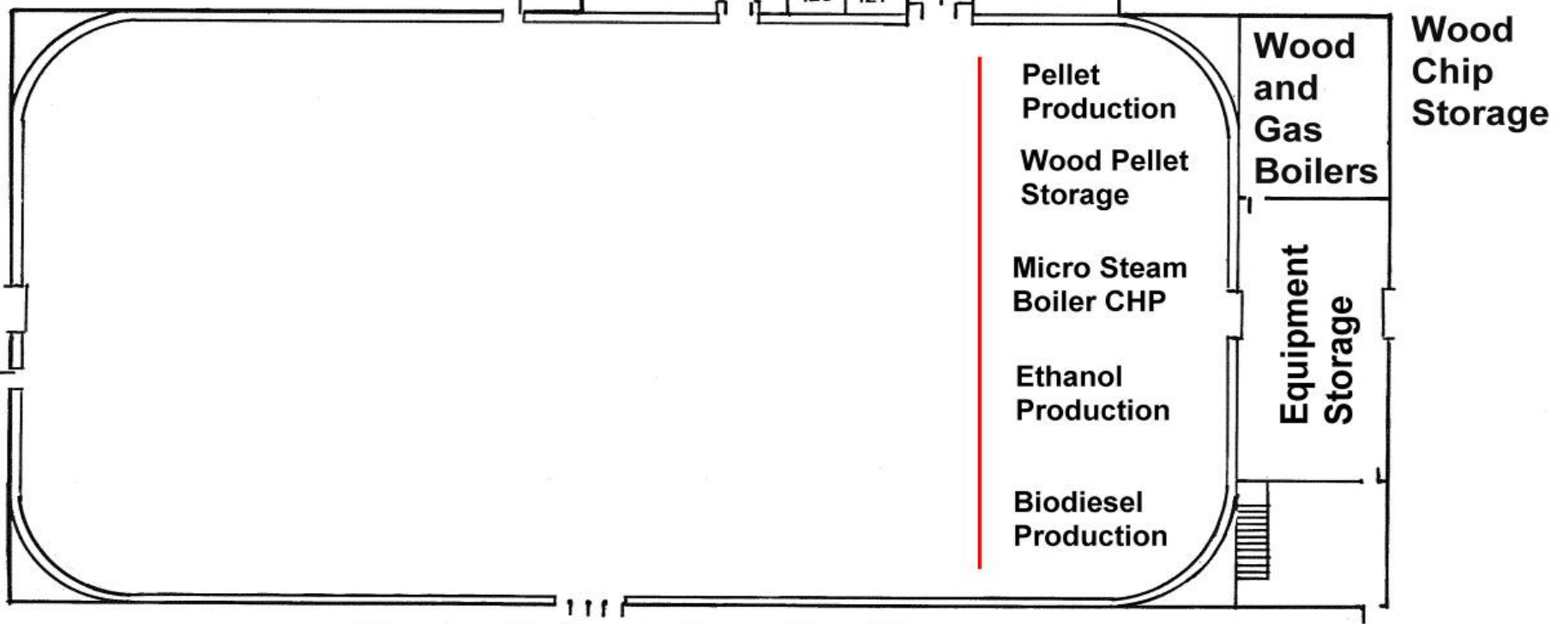
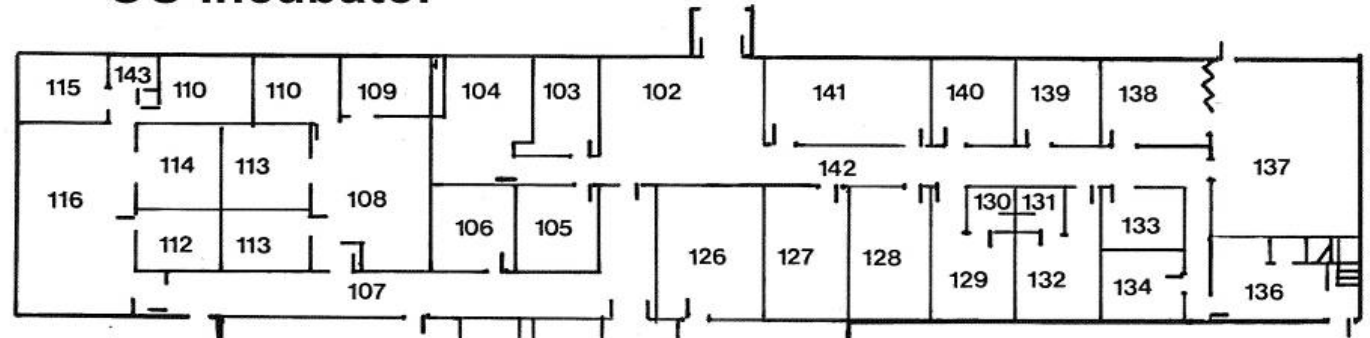
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OU Incubator



Shotwell-Gustafson Pavilion



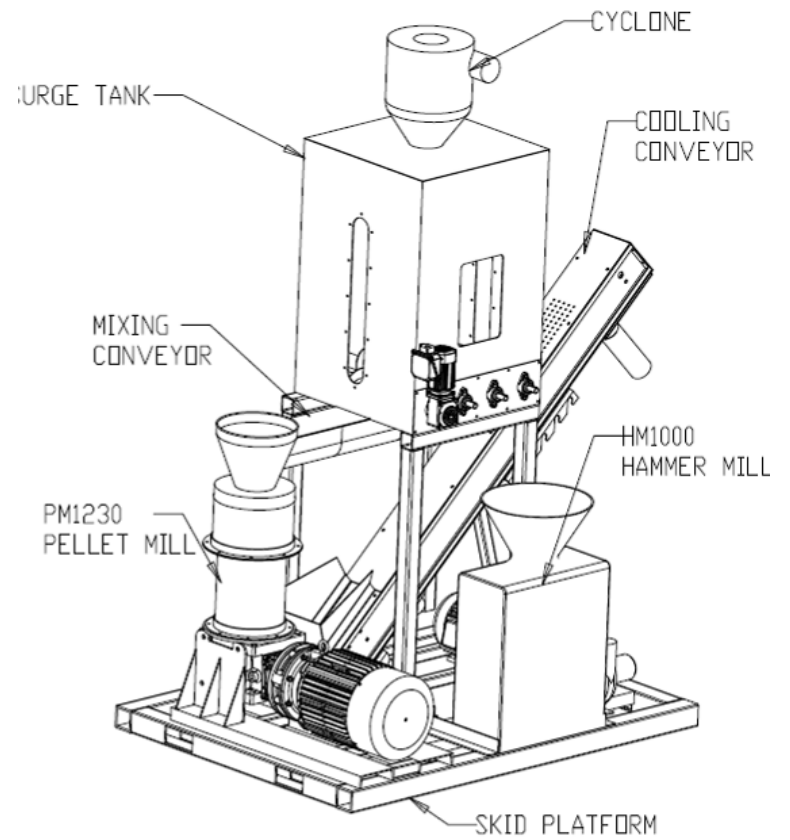
30 HP Pellet Mill



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Pellet Mill

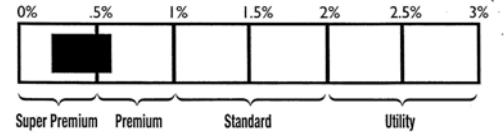




Densification Testing and Demonstration

Proposed Ash Rating Scale Version 1

ASH CONTENT SCALE



To learn more about this Ash Content Scale as well as other information on pellet heating, please visit www.pelletheat.org



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Other Equipment



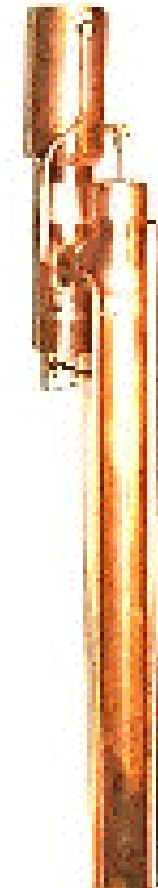
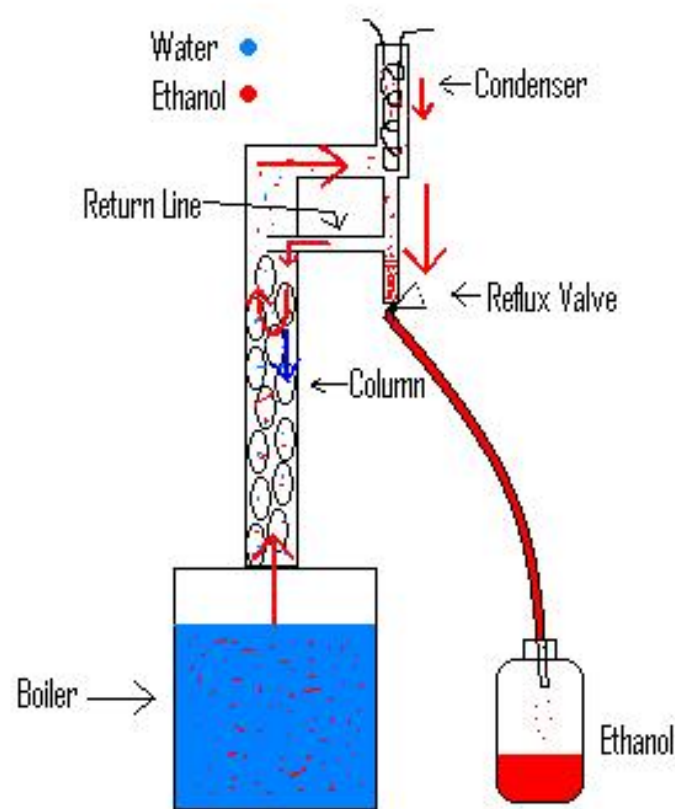


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Biodiesel Demonstration



Fuel Ethanol Demonstration



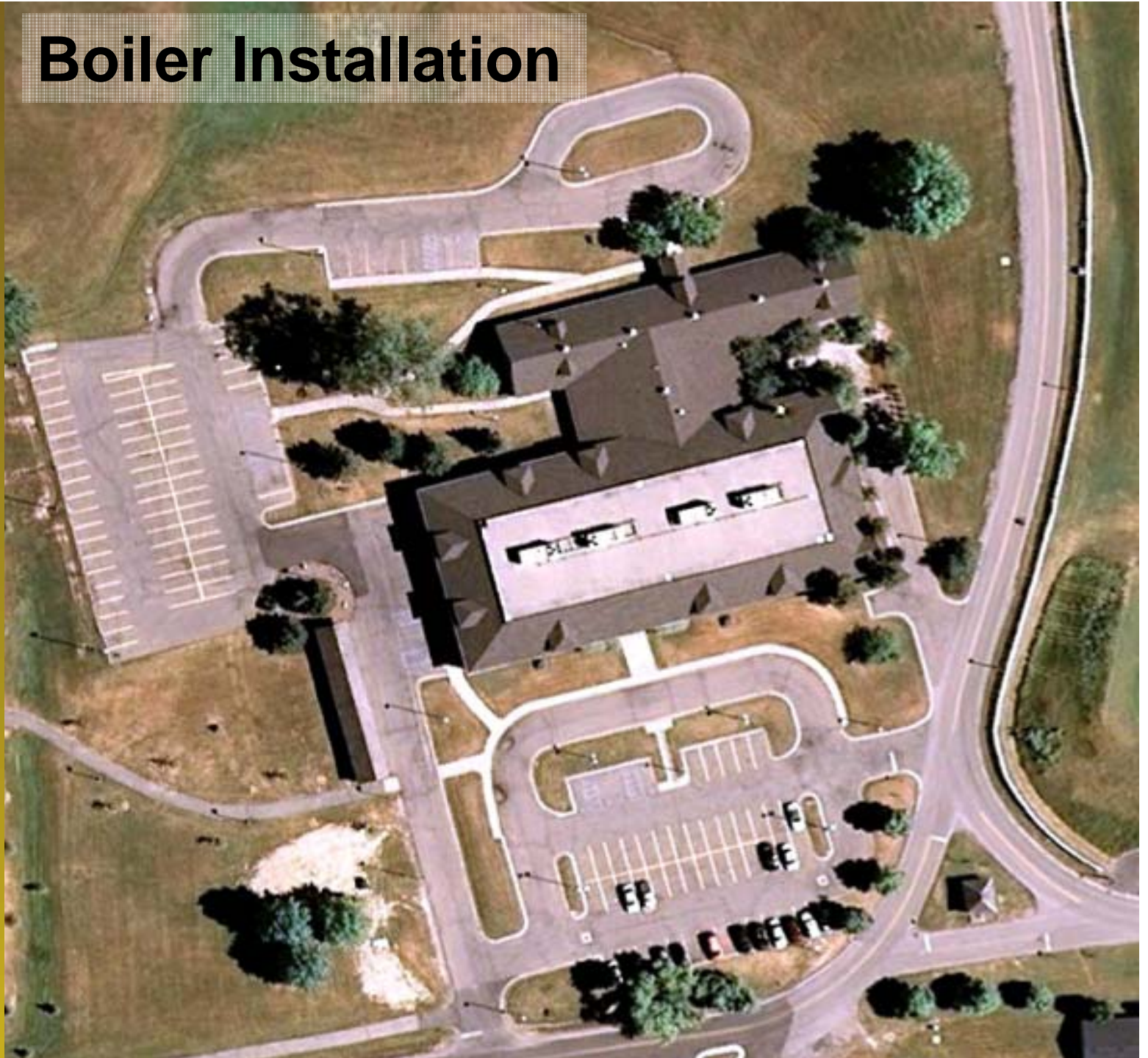
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Boiler Installation



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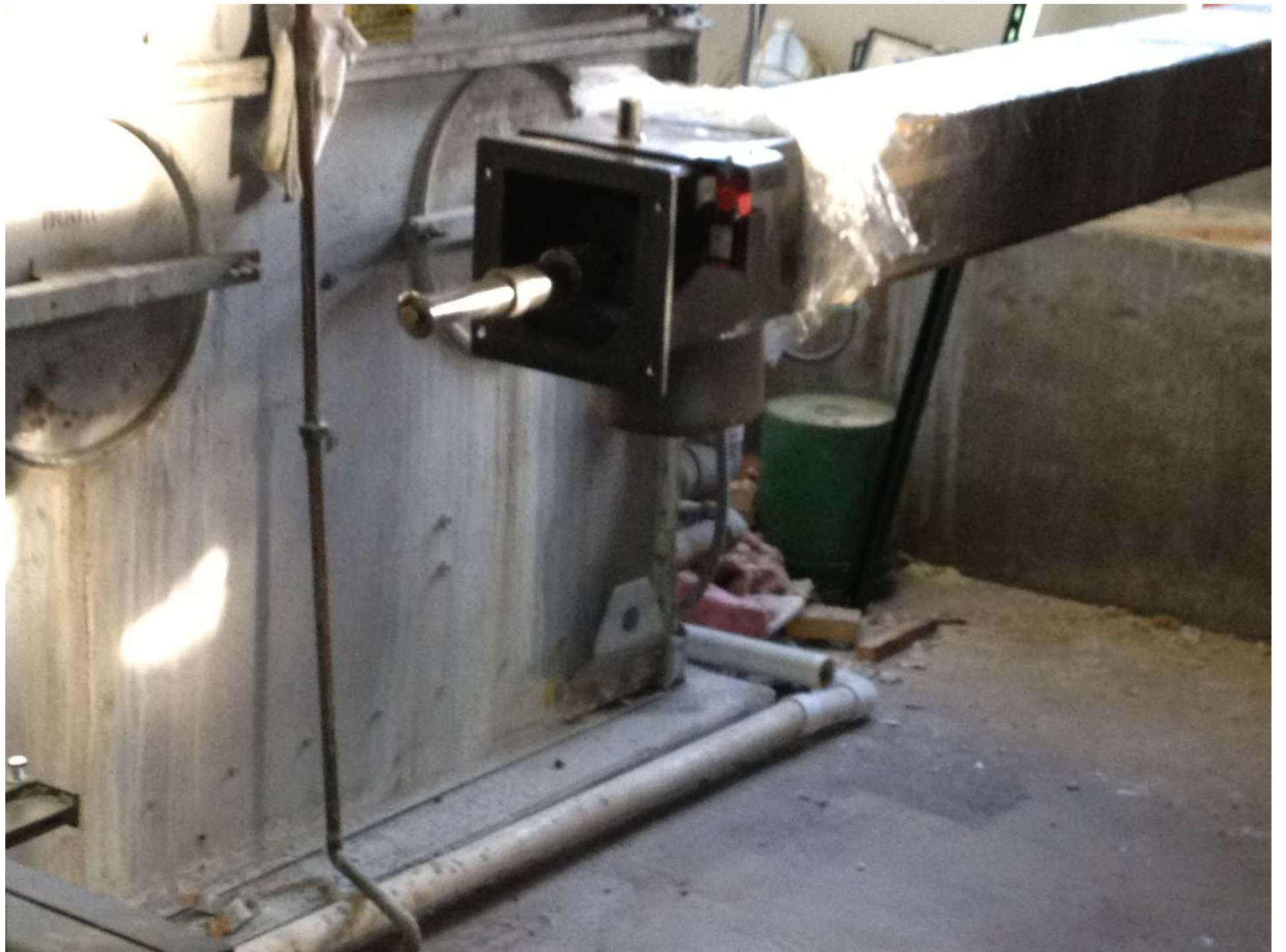






































[Click for 2 min Video](#)

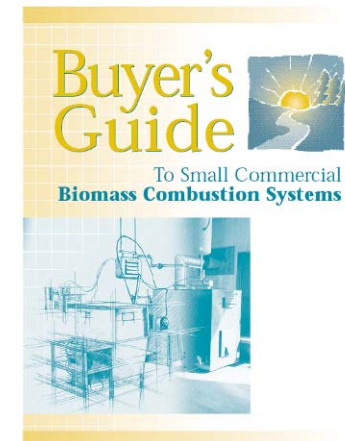


For More Information



www.biomasscenter.org

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