



HEATING KODIAK: A BIOMASS SOLUTION

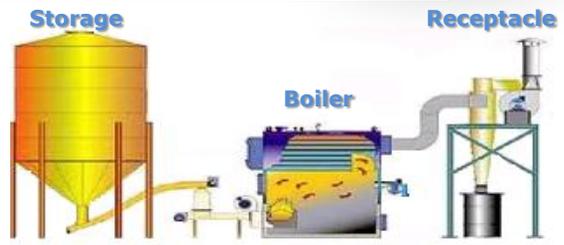
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PROBLEM STATEMENT:
Base Support Unit Kodiak, AK will be converting from a central oil heating system to a wood pellet biomass heating system in order to reduce energy costs and environmental impacts. BSU Kodiak requires a wood pellet storage system sufficient to support the demands of the unit.

OBJECTIVES:

- Analyze and design the most economical method for the storage and logistics of wood pellet biomass.
- Promote the Commandant's environmental stewardship policy by reducing the base's dependency on fuel oil.
- Compare the efficiencies and conduct a cost-benefit analysis for the use of wood pellets and fuel oil.



**TYPICAL BIOMASS HEATING SYSTEM
PROVIDED BY THERMAL SYSTEMS INC**

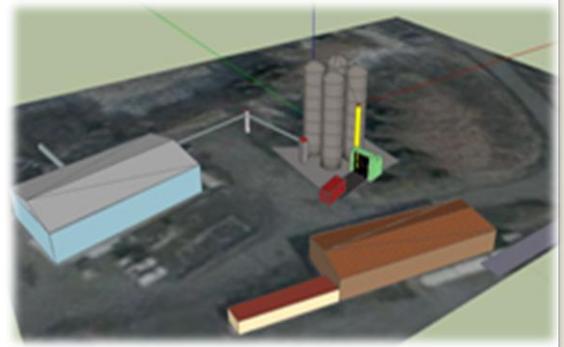
**MOVABLE CONTAINER
STORAGE**



**CONCRETE SILO
STORAGE**



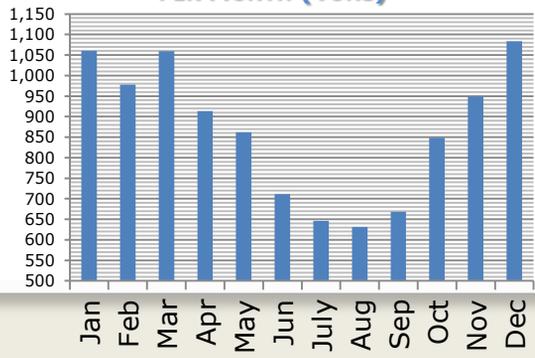
CONCEPTUAL SITE LAYOUT



RECOMMENDATIONS:

- 4 X 500 ton concrete silos
 - Holding an 8 week supply
 - 4900 ft² undeveloped area East of Building #24
- (60) 20' conex boxes in storage next to Seafarer Drive
- Docking station with tip containers
- Use screw conveyors to transport material
- Use reinforced concrete 2-way slab foundation

**ESTIMATED WOOD PELLET USAGE
PER MONTH (TONS)**



RESULTS:

- Construction Costs: \$9.8M
- Cost/Year biomass(1st yr): \$4M with 2% inflation rate
- Cost/Year fuel oil(1st yr): \$5.1M with 6% inflation rate
- Payback period ~ 7 years

ENERGY DEMAND GRAPH:

- Based off FY '09-'11
- Peak months: Dec-Mar (Average 35 tons per day)
- Summer months: Jul-Sep (Average 21 tons per day)
- Pellet storage must be designed for peak winter months
- Minimum 3 month supply