COMBINED HEAT AND POWER PLANT PROJECT SUMMARY
FOR PRELIMINARY BOARD OF GOVERNOR’S APPROVAL
JANUARY 2021
Table of Contents

1. Existing Conditions
2. Opportunity
3. Impact
4. Space Needs
5. Cost
1. **Existing conditions**

Steam heat for the main campus at Colorado State University is obtained from a single facility located in the Heating Plant building. Natural gas is the primary fuel with a redundant #2 diesel as a backup in the event of a loss of the natural gas supply.

The existing building is located at a relatively low elevation, which assists in the performance of the gravity-fed condensate system. One major disadvantage to the location is that the heating plant is located in the CSU 100-year flood plain. It has been damaged by floods on four occasions over the last 80 years, the most recent in 1997. Existing 1960’s vintage boilers in the plant are nearing the end of their useful life and will need to be replaced starting in approximately 2025.
2. Opportunity

CSU Utility Engineering, in coordination with the City of Fort Collins and the Platte River Power Authority, completed a feasibility study to review relocation of the plant out of the flood plain, and the use of Combined Heat and Power (CHP) technology, before investing in boiler replacement. The campus has substantial steam and electrical demands, making it a very good candidate for a CHP plant. CHP technology utilizes a natural gas turbine to produce electricity and the waste heat from the turbine produces steam. The study recommended the current motor pool block as the optimal location for a new central heating plant for main campus, due to location out of the flood plain and proximity of the steam and condensate loops. Based on the planning done to date, construction of the new heating plant would require relocation of several facilities management functions and it would trigger stormwater improvements. The basement of the existing heating plant would be retained as a lift station for condensate, but the remainder of the building could be repurposed programmatically.
3. Impact

The District Heating Plant is a critical facility and loss due to flood has been shown to be a significant financial burden. In the 1997 flood the heating plant was off-line for several days, with damage at just under $1M (1997 dollars). A new location for the heating plant that is out of the flood plain will improve our overall campus resilience.

The District Heating Plant already provides higher efficiencies and better pollution control compared with localized boilers. A CHP plant would further improve energy efficiency and allow for decreased CO₂ and NOx emissions in alignment with CSU’s Climate Action Plan.

4. Space Needs

Preliminary equipment layout by the third-party consultant indicates the new plant would be approximately 13,500 gsf.

5. Cost

Heating plant construction costs were estimated by the third-party consultant. Facilities Management provided an estimate of the stormwater improvements and FM building replacements that would be required. The estimated cost for the new heating plant is $40-$50M, depending on when the project receives final approval. Funding is anticipated to be from bonds or a 3rd party PPA agreement.