

Capitol Campus Design Advisory Committee

March 31, 2016

Capitol Campus Central Plant

Purpose: Information & Feedback

The purpose of this agenda item is to brief and seek feedback from the Capitol Campus Design Advisory Committee (CCDAC) on the Capitol Campus Central Plant Conversion - Alternative Site Analysis. Ron Major, Resource Conservation Manager, will present the agenda item.

Background

The Department of Enterprise Services (DES) received an appropriation in the 2015 - 17 Capital Budget for an Investment Grade Audit (IGA)/ Energy Services Proposal (ESP). The IGA will study the conversion of the Capitol Campus steam system to a hot water system and to incorporate a Combined Heat and Power plant.

The current steam system, including boilers and distribution piping, is at the end of its useful life and is approximately 34 percent efficient. Because of these conditions, there is the opportunity to replace the system with a more energy efficient system. This will reduce both the operational cost of heating the Capitol Campus buildings and the carbon footprint of the campus.

The IGA will:

1. Use an upgraded steam system as the baseline.
2. Evaluate replacement of existing steam production and distribution system with a hot water system.
 - a. Size system for future expansion of Capitol Campus.
 - b. Consider synergy with the chilled water system for opportunities to improve overall efficiency.
3. Analyze the feasibility of a Combined Heat and Power (CHP) plant.
 - a. The plant will be sized to the thermal load of the campus, yielding approximately 2 Megawatts of electricity from waste heat.
4. Evaluate feasibility of a new Central Plant.

Status

Through a rigorous selection process, DES hired the Energy Services Company, University Mechanical Contractors (UMC), to conduct the IGA and develop an Energy Services Proposal. UMC provides technical expertise and leads the design team. Together, DES and our consultants are conducting a comprehensive investigation to identify solutions to meet the needs of heating and cooling the campus. With the expectation these solutions will meet our goals of lower operating costs and reduced environmental impact. The objective is to provide decision makers with the best information available so they can make an informed decision on the future of this critical infrastructure.

- During the preliminary assessment multiple risks were identified with the existing Capitol Campus steam system and existing central plant. Some of these risks have been previously identified and are included in the DES ten year plan.
 - Seismic retrofit, hillside stability retrofit, flood protection, removal of the 35,000 gallon fuel storage tank and the associated moat, and shoreline stabilization.
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Knowledge of these requirements led the team to consider an alternative site for this critical infrastructure. Exploring the option of a new central plant provides the opportunity for best practices when siting this critical infrastructure. To that end, the consultants have been directed to deliver:

- An Investment Grade Audit for three options with 50 year lifecycle cost analyses, including:
 - Business as usual steam system upgrades.
 - New hot water system with CHP in the existing central plant.
 - New hot water system with CHP at new central plant location.
- Development of each option to include but not limited to:
 - Consideration of the total cost of ownership and carbon reduction.
 - Consideration of access, noise, sightlines, adjacent neighborhoods, integration into campus master planning and architecture, historic preservation and all costs for remediation, code requirements and/or improvements for all options.
 - Consideration of the energy demands of future buildings on the Capitol Campus, with central plant capacity for future equipment needs.

The three alternatives are:

1. Business as usual – Steam heat at the Central Plant with all required code and safety improvements. This alternative will also include chilled water production for the West Campus at the central plant and an East Campus chilled water loop (to include a centralized East Campus chiller plant within the life of the analysis).
 2. Hot Water heat at the Central Plant – Hot water boilers and a two Megawatt gas turbine located at the central plant. This alternative includes all required code and safety improvements. This alternative would include chilled water production for the West Campus at the Powerhouse and an East Campus chilled water loop (to include a centralized East Campus chiller plant within the life of the analysis).
 3. Hot Water heat at Office Building 2 (OB-2) - A new Central Plant with hot water boilers and a two Megawatt gas turbine located at OB-2, in “50 level” and east lawn. This alternative would include chilled water production for the entire campus at a centralized East Campus location within the life of the analysis. Heating and cooling functions would be fully removed from the historic Powerhouse building.
- The OB2 site was selected as a possible alternative site after much deliberation. It was important to provide some direction to the team to assess impacts and develop costs.

Next Steps

- Complete the Investment Grade Audit concluding in an Energy Services Proposal.
 - Fully develop all three scenarios above for consideration.
- At the April 25, 2016 meeting, inform the State Capitol Committee (SCC) of the alternatives analysis to prepare the Committee for a possible decision to relocate the Central Plant at a future SCC meeting.
- Complete the Investment Grade Audit concluding in an Energy Services Proposal and a fully developed analysis of the three alternative scenarios described above.
- Present the assessment results of the three alternatives to CCDAC at the May 19, 2016 meeting and seek recommendations.
- Present CCDAC’s recommendations to SCC at the June 16, 2016 meeting for consideration and decision, if needed.
- Include a well-informed capital budget request for this important infrastructure project in the 17-19 biennium.