

## Capitol Campus Heating and Cooling System Project Frequently Asked Questions

### **1) How old are the systems being upgraded?**

The Capitol Campus steam system was installed in 1920 and expanded as new buildings were built on west and east campus. Repairs and updates to portions of the system have been done at various times. The last major upgrade was installation of new boilers in the 1970s. Another update in 2010 upgraded the boiler controls, improved insulation and replaced six steam valves.

The campus cooling system at the Powerhouse has two chillers that are 40 years old and one that is 10 years old.

The system at the Governor's Mansion is 70 years old. Portions of the mechanical equipment in it have been rehabilitated at various times over the years, with the last set of repairs and partial replacements completed in 2000.

### **2) How is the project funded, and how much does the project cost?**

The 2013 Legislature included an Enterprise Services request for \$3.9 million to do heating and cooling system projects in a 2013-15 capital budget [proviso](#) and also directed Enterprise Services to address efficiency, maintenance and repair needs at the Governor's Mansion. The appropriation covers the cost of the work needed for the campus heating and cooling systems. Utility savings will be used to pay for work that the Legislature directed Enterprise Services to do at the Governor's Mansion.

### **3) What will be done to upgrade the cooling system?**

The two 40-year old chillers will be replaced with one chiller that is twice as efficient. The new chiller also eliminates the use of the ozone-depleting refrigerant R-11.

Other system adjustments, including piping and pump changes, will be made to improve system efficiency. The project also will identify improvements that can be made in the future.

### **4) What will be done to upgrade the steam heating system?**

The system will be evaluated to identify failing or faulty components that pose safety risks, and upgrades will be done to make it safer and more efficient, to address access issues in the tunnels that make maintenance difficult, and to improve metering in each building. Metering helps achieve best practices for operating the system by capturing valuable information about energy use that can be used to manage operations, schedule maintenance, and identify potential improvements. It also fulfills reporting requirements in RCW [19.27A.190](#).

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## 5) How will the steam heating system project improve safety?

Energy improvements and safety go hand in hand. Hazards that make maintenance difficult also tend to adversely affect energy use.

An energy audit is underway that will include a survey of plan and building operators regarding their concerns. Engineers will conduct site visits with Enterprise Services steam system operators to gather information.

In general, areas of safety concern and likely energy loss in a steam system relate to:

- Safely operating steam traps. As steam loses heat, it turns back into water. The water that forms is known as condensate. A steam trap is used to release condensate from the pipework while preventing steam loss from pipes. Removing condensate protects against “water hammer,” which can create pressure that can cause catastrophic failure. Condensate also degrades the steam pipes.
- Accessibility of areas that need maintenance
- Leaks
- Faulty expansion joints
- Maintaining valves, supports, and insulation
- Managing hazardous materials
- Avoiding burn hazards

The energy audit also will assess whether there is a need for additional steam system operator training.

Once the energy audit is complete, a plan to address specific issues will be drafted.

## 6) Why is the Governor’s Mansion being removed from the steam heating system?

Since 1920, the mansion has relied on the campus steam system that was designed to serve office buildings. Taking the mansion off the campus system and installing a new boiler there will bring utility cost savings campus-wide as well as at the Governor’s Mansion.

Several months of the year, the 21,400 square-foot mansion must be heated 24 hours a day, seven days a week, driving a round-the-clock schedule for the [1.53 million square feet of office building space](#) that the campus steam system is really designed to serve.

When the mansion is separated from the steam system grid, office buildings will be heated from 6 a.m. to 6 p.m. on weekdays. Heat will be turned down overnight, on weekends and on holidays to save money.

In addition, the mansion’s internal steam system is at the end of its life and needs to be replaced. The existing system operates at about 60 to 70 percent efficiency. The new system at the mansion will operate at 90 to 95 percent efficiency.

## 7) How does the campus steam system work?

Natural gas boilers at the central powerhouse make steam, which is distributed to buildings via pipes. At buildings, steam makes hot water for heating system use as well as domestic hot

water. The steam condenses, becoming water again, and that water is returned to the steam plant.

**8) How does the campus chiller work?**

Electric chillers at the central powerhouse make chilled water at 44 degrees Fahrenheit. The water is pumped across the campus and circulated through coils, which are installed throughout each office building.

**9) Who is the contractor for the work?**

DES utilized its [Energy Saving Performance Contracting Program](#) service to select a contractor for the energy improvement projects. [McKinstry](#) is the contractor selected for the work on the Governor's Mansion while [University Mechanical Contractors](#) has been selected to work on the steam and cooling systems.

**10) Where can I learn more about Energy Savings Performance Contracting?**

You can learn more on the Enterprise Services [website](#).